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Anticipated Classification

Class: _____

Subclass: _____

1c542 U.S. PTO
09/641627
08/18/00

BOX: PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

TRANSMITTAL FOR CIP PATENT APPLICATION

Sir:

Transmitted herewith for filing under 37 C.F.R. § 1.53(b) is a patent application which is a continuation-in-part (CIP) of pending prior applications Serial No. 09/349,608, filed on July 8, 1999, and Serial No. 09/496,560, filed on February 2, 2000.

The present CIP application is entitled SYSTEM FOR INTERACTION WITH EXERCISE DEVICE and is filed in the name of the following inventor(s): Scott R. Watterson, William T. Dalebout and Darren C. Ashby

Enclosed are the following:

- ☒ A specification, claims, abstract, and cover page in total comprising 120 pages.
- ☒ A set of 20 sheets of drawings.
- ☒ No Declaration, Power of Attorney, and Petition is enclosed.
- ☒ No Assignment is enclosed.
- ☒ No fees are enclosed

- ☒ A Certificate of Mailing by "Express Mail" certifying a filing date by use of Express Mail Label No. EL550340425US
- ☐ An Associate Power of Attorney.
- ☒ Priority to United States Patent Application Serial No. 09/349,608 filed on July 8, 1999 and United States Patent Application Serial No. 09/496,560 filed on February 2, 2000 is claimed under 35 U.S.C. § 120.
- ☐ Priority to _____ (country) Application Serial No. 09/349,608 filed on July 8, 1999 is claimed under 35 U.S.C. § 119.
- ☐ A certified copy of the above priority application is filed in prior application Serial No. 09/349,608, filed July 8, 1999.
- ☒ A duplicate copy of this letter is enclosed.

JCS42 U.S. PTO
09/641627
08/18/00

Please address all future correspondence in connection with the above-identified patent application to the attention of the undersigned.

Dated this 18th day of August, 2000.

Respectfully submitted,



David B. Dellenbach
Attorney for Applicant
Registration No. 39,166



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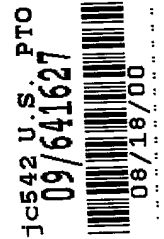
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I hereby certify that the following documents are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10 on the date indicated below in an envelope addressed to: BOX: PATENT APPLICATION, Assistant Commissioner for Patents, Washington, DC 20231:

- CIP Patent Application in the name(s) of Watterson et al. for SYSTEM FOR INTERACTION WITH EXERCISE DEVICE comprising 120 pp.
- A set of 20 sheets of drawings
- Transmittal Letter (2 pages)
- Certificate of Express Mailing Label No. EL550340425US
- Postcard

Dated this 18th day of August, 2000.

Respectfully submitted,

David B. Dellenbach
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PATENT APPLICATION
Docket No. 13914.579.1

UNITED STATES PATENT APPLICATION

of

Scott R. Watterson

William T. Dalebout

and

Darren C. Ashby

for

SYSTEM FOR INTERACTION WITH EXERCISE DEVICE

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BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to exercise equipment and, more specifically, to systems and methods for providing improved exercise devices in combination with other users and/or a live or stored trainer via a communications network.

2. Related Patent Applications

This is a continuation-in-part application of co-pending patent application serial number 09/349,608, filed July 8, 1999 entitled "Systems and Methods for Providing an Improved Exercise Device with Motivational Programming" that is incorporated herein by reference. This application is also a continuation-in-part application of co-pending patent application serial 09/496,560 number, filed February 2, 2000 entitled "System and Method for Selective Adjustment of Exercise Apparatus" that is incorporated herein by reference.

3. The Relevant Technology

In an attempt to improve their health and physical conditioning, consumers are purchasing home exercise devices in record quantities. One common challenge with home exercise equipment is motivating the purchaser to use the device on a consistent and ongoing basis, while providing access to experienced trainers and individually developed exercise programs from the comfort of a user's own home. In addition, many exercise devices involve repetitive actions, which can quickly become tedious to a person exercising alone.

1 Health clubs, on the other hand, have organized various exercise classes and
2 routines involving a group setting. In the proper setting, a group approach to exercise
3 creates a synergy, whereby individual members of the class derive encouragement and
4 motivation from other members of the group.

5 Furthermore, while individuals exercise at a health club they are taught the correct
6 techniques for exercising, thereby reducing the possibility of being injured during an
7 exercise program. In addition, group settings promote a healthy sense of competition
8 among group members. Initially, such group fitness and exercise classes typically
9 involved aerobics, traditionally performed without the use of any ancillary exercise
10 equipment or devices. In recent years, however, the group work out approach has been
11 extended to classes that utilize various exercise devices. Take, for example, the recent rise
12 in popularity of "Spinning Classes," in which each participant operates his or her own
13 stationery exercise cycle in a group setting, with a coach or instructor leading the group
14 through a prescribed program or routine. Similarly, with recent advances in the design of
15 treadmills, it is possible to have "Treadmill Classes" wherein an instructor not only leads
16 the group, but the instructor is also able to control the operation of the treadmills of all of
17 the class participants from a single control panel.

18 One of the primary disadvantages with group training, however, is that it is
19 typically available only at health clubs and, therefore, is not as convenient as exercising in
20 the privacy and comfort of one's own home. It would, therefore, be a definite advancement
21 in the art of home exercise equipment to provide the desirable benefits of group exercise in
22 a home setting. Some efforts have been made in the prior art to introduce a level of
23 "interactivity" into exercise machines. For example, U.S. Patent No. 5,489,249 discloses a
24

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1 video exercise control system in which a videocassette recorder (VCR) or similar device is
2 coupled, via a hard wired connection, to an exercise machine, such as a treadmill. As an
3 individual exercises on the treadmill, the VCR in synchronization with prerecorded
4 audio/video presentations controls the speed and incline of the treadmill. U.S. Patent No.
5 5,645,509, entitled "Remote Exercise Control System" that is incorporated herein by
6 reference, discloses a remote exercise control system in which an exercise machine, such
7 as a treadmill, may remotely communicate via a communications module with an
8 evaluation module located at a remote location. Signals indicative of the operating
9 parameters of the treadmill are transmitted from the treadmill to the evaluation module,
10 and control signals are transmitted from the remote evaluation module for controlling the
11 operating parameters of the treadmill. U.S. Patent No. 5,888,172 is representative of
12 another, in which an exercise device is coupled, via hard wired connection, to a video
13 game device, such that the operating parameters of the exercise device are used as inputs to
14 the video game controller, which then produces a video display based on the inputs
15 received. However, these approaches nevertheless fail to provide many desirable benefits
16 of group exercise.

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OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the present invention is to improve home exercise equipment by providing home exercise devices that are capable of simulating a group or class workout environment and synchronizing operation of the exercises devices with exercise programming.

It is an object of the present invention to provide an exercise device that is capable of being controlled by packetized signals received from a trainer.

It is another object of the present invention to provide an exercise device that is capable of enabling a user to communicate with a distantly located trainer.

It is yet another object of the present invention to provide an exercise device that communicates with a communication system that enables real-time communication with a trainer or alternatively access to one or more stored exercise programs.

Yet another object of the present invention is to provide an exercise system that enables one or more users to receive real-time signals from one or more trainers via a network.

Still yet another object of the present invention is to provide an exercise system that enables a third party to control one or more user exercise devices and one or more trainer exercise devices in real-time.

Another object of the present invention is to provide an exercise system that enables a user to access various exercise equipment and information from a variety of locations.

The present invention is directed to devices, systems, methods, programs, computer products, computer readable media, and modules for controlling the operating parameters of one or more devices by one or more distantly located, or optionally closely located,

Thus, according to the present invention, it is possible for a user to exercise on a device, such as a treadmill, while a trainer receives data regarding the operating parameters

1 of the treadmill (and optionally of the user of the treadmill, e.g., heart rate), such as speed,
2 inclination, etc. Upon receiving this data, the trainer can modify the operating parameters
3 of the user's treadmill such that the user achieves an exercise program designed by the
4 trainer. The trainer can also communicate in real time with the user without interrupting
5 any control signals that control the treadmill or other exercise device. The user can also
6 communicate with the trainer without affecting any of these controls during such
7 communication.

8 A variety of different options are available for achieving the desired real time
9 communication. According to one such option, a user can receive a broadcast from a live
10 trainer (human being) or a stored trainer (e.g., a website, video, disk, or dynamic or
11 interactive software program) upon activating the exercise device. As another option, the
12 user can receive programming in response to a signal sent by the user. As yet another
13 option, the trainer can analyze information about the exercise device (e.g., speed) and/or
14 user (e.g., heart rate) and control the operating parameters of the exercise device and/or
15 provide recommendations to the user through audio or video communication.

16 Thus, the present invention relates to an exercise device capable of achieving real
17 time communication with either: (i) a live or (ii) stored trainer. The present invention also
18 relates to an exercise system comprising: (i) one or more user devices, such as an exercise
19 device; (ii) one or more trainer devices, such as another similar exercise device connected
20 to each other in a master/slave relationship. Optionally, in addition to the master and slave
21 devices, a third party can control the master and/or slave. Examples of such third parties
22 include an individual located at a master control console that controls the master and/or
23 slave, such as in the setting of a spinning class.

1 The trainer and user may be linked in direct communication (e.g., master/slave) or
2 indirect communication, such as by linking both the trainer and the user to a
3 communication system that controls the operating parameters of an exercise device used by
4 the user and/or trainer. For example, if both the trainer and the user devices are connected
5 to a communication system, such as a website, the website may control the user device
6 and/or the trainer device. Alternatively, the communication system may track changes of
7 the operating parameters of the trainer device and modify the operating parameters of the
8 user device based upon the changing parameters of the trainer device.

9 Optionally, a stored trainer (e.g., a website) controls a user device without requiring
10 the services of a live trainer. The present invention also enables first and second users to
11 compete against each other by connecting their corresponding exercise devices to a
12 communication system, such as a website.

13 The present invention also relates to programming, computer products and
14 computer readable medium including instructions designed to facilitate the above-
15 described systems, inventions and exercises and other systems, devices, and exercises. As
16 will be discussed in greater detail, the present invention is not limited to any particular
17 device, although treadmills and other exercises are employed as examples to illustrate the
18 operation and function of the present invention.

19 These advantages in addition to other objects and advantages of the invention will
20 be set forth in the description which follows, and in part will be obvious from the
21 description, or may be learned by the practice of the invention. The objects and
22 advantages of the invention may be realized and obtained by means of the instruments and
23 combinations particularly pointed out in the appended claims.
24

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the manner in which the above recited and other advantages and features of the invention are obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof that are illustrated in the appended drawings. Understanding that these drawing depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

Figure 1 is an exercise system according to the teaching of the present invention;

Figure 2 is a perspective illustration of a reorienting treadmill with the tread base positioned in a first position for a user to perform exercises to be used in the exercise system of Figure 1;

Figure 3 is a perspective illustration of a reorienting treadmill of Figure 2 with the tread base positioned in a second or storage position;

Figure 4 is a partial plan view of portions of the reorienting treadmill illustrated in Figures 2 and 3 with the treadmill oriented in the second or storage position and with the bottom cover removed, revealing some of the internal components of the treadmill;

Figure 5 is a partial exploded perspective view of the incline mechanism incorporated into the treadmill illustrated in Figures 2 through 4;

Figure 6 is a perspective illustration of a control panel of the reorienting treadmill of Figure 2;

Figure 7 illustrates an exemplary computer and associated system that provides a suitable operating environment for the exercise system of Figure 1;

Figure 18 is a flow diagram representing the process of performing diagnostic on the treadmill of Figure 2 from a distant location;

Figure 19 is a flow diagram representing the actions performed by the user and communication module to create audio and video programs in accordance with the teaching of the present invention;

Figure 20 is a functional block diagram of a master-slave system according to the teaching of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is directed to devices that include one or more motors or other electrically driven actuators used to control one or more operating parameters of the device. While the invention will be described in the context of a motorized treadmill, it should be understood that the invention is not limited to any particular type of exercise device. To the contrary, the present invention can be readily adapted to any motorized device or any other device that utilizes motors, solenoids, or any other electrically driven actuators to control any operating parameter of the device, such as speed, resistance, incline, time, temperature, or other similar operating parameters. The term "device" or "devices" shall refer broadly to any type of apparatus that includes one or more stepper motors, solenoids, or other electrically driven actuators or controllers. Additionally, the term "exercise devices" shall refer broadly to any type of device that takes the form of an exercise machine, including, but not limited to, treadmills, exercise cycles, Nordic style ski exercise devices, rowers, steppers, hikers, climbers, and elliptical or striding exercise devices.

Depicted in Figure 1 is a representation of one illustrative system, designated by reference numeral 10, that may incorporate the novel features of the present invention, including various novel devices, hardware and software modules, and the like that may be remotely accessed and controlled in a real-time manner. As shown, one or more exercise mechanisms, such as a treadmill 12a-12n is in communication with one or more trainers at treadmill 20a-20n via a translator device 13 and a personal computer 14. The translator device 13 and personal computer 14 communicate with a network 16 that is a communication network that enables various hardware and software modules and devices

1 to communicate one with another. Network 16, therefore, may be a local area network
2 (LAN), wide area network (WAN), wireless network, packetized network, real-time
3 network, and the like. Network 16 facilitates communication of treadmill 12 with a live
4 trainer on treadmill 20 and/or communication system 18 (e.g. a website). Communication
5 system 18 assists communication between a user on treadmill 12 and either a live trainer
6 on treadmill 20, or some other third party 21, as will be described in more detail
7 hereinafter. Optionally, communication system 18 acts as a stored trainer or connects to a
8 stored trainer.

9 The following discussion will be directed to only a single treadmill 12 and a single
10 treadmill 20, however, it may be appreciated that a similar discussion may be had for
11 multiple treadmills 12a-12n, 20a-20n. In addition, although only one of each element of
12 system 10 is depicted, it may be appreciated by one skilled in the art that system 10 may
13 have a mixture of both single and multiple elements, for example, at least one treadmill 12,
14 20, translator device 13, personal computer 14, network 16, and communication system 18.
15 Alternatively, one or more of the elements of system 10 may be eliminated or the
16 functionality thereof incorporated within the structure and function of one or more of the
17 other elements of system 10.

18 Similarly, although each of the elements of system 10 are shown separated one
19 from another, it may be appreciated by one skilled in the art that the hardware and/or
20 software elements of the present invention may be incorporated within two or more
21 elements. For example, translator device 13 and personal computer 14 may be
22 incorporated within treadmill 12. Similarly, the hardware and/or software elements of the
23 communication system 18 may be incorporated within treadmill 20.
24

1 As defined herein, the term "trainer" or "third party" 21 may include: (i) a live
2 human being; or (ii) a stored trainer, such as a website, computer, optical media (e.g.,
3 compact disk or digital video disk), visual media, or magnetic media (e.g., videotape,
4 readable disk), an electronic monitoring system, dynamic computer readable instructions,
5 interactive and/or dynamic software programs, computer readable instructions, and other
6 media and hardware and/or software modules and components, whether or not the trainer is
7 located at treadmill 20 or at some other location. In one embodiment, the third party is
8 another trainer.

9 Generally, system 10 enables exercise programming with control signals to be
10 transmitted from a trainer at treadmill 20, or alternatively from communication system 18,
11 to a user at treadmill 12. As disclosed in U.S. Patent Serial No. 09/349,608 entitled
12 "Systems and Methods for Providing an Improved Exercise Device with Motivational
13 Programming," which is incorporated herein by reference, the programming may include
14 motivational content and/or one or more control signals that may be used to control the
15 operating parameters of treadmill 12 in real-time in an uninterrupted manner. The control
16 signals may be synchronized with the motivational content and designed to control one or
17 more operating parameters of the exercise device, such as the speed, incline, difficulty of
18 exercise program, time, distance, and the like of an exercise program performed on
19 treadmill 12.

20 As used herein, the term "motivational content" is used to broadly refer to any
21 audio material, including dialog, narration, sound effects, and/or music, either alone or in
22 combination with video material. In one embodiment of the present invention, the
23 motivational content is stored in communication system 18 and includes an audio/video
24

Generally, the second real-time signal may include both the motivational content and the control signals, whether or not such control signals are synchronized with the motivational content. Alternatively, the second real-time signal may include only the motivational content, other signals representative of measurable parameters of the exercise device (e.g. speed, inclination, resistance, etc) and/or a user of the exercise device (e.g. heart rate, blood pressure, etc), and the like. For example, treadmill 12 may transmit one or more signals to communication system 18. The signal may include parameters such as the status of the exercise device, e.g., active status (i.e., on), deactivated status (i.e., off), standby status (i.e., waiting), and the like, and/or parameters such as speed, inclination, resistance. Additionally, the signal may include parameters regarding the user, such as heart rate, blood pressure, and the like. Alternatively, treadmill 12 may receive programming “broadcast” by communication system 18 and/or a trainer at treadmill 20,

1 structures, side members, and cross members, or be devoid of one or more of such
2 structures and members.

3 The tread base 26 typically includes a pair of side rails 34, 36 each having a front
4 portion proximal to and a rear portion distal from upright support structure 24 when tread
5 base 26 is in a downward exercisable position. As shown in Figure 4, a front pulley 38 and
6 a rear pulley 40 are disposed between and supported by side rails 34, 36, while a
7 continuous belt 42 extends between and around front and rear pulleys 38 and 40,
8 respectively. Pulleys 38, 40 and belt 42 may have various configurations and be fabricated
9 from various materials, as known by one skilled in the art and commonly known within the
10 exercise industry.

11 A deck 44, commonly fabricated from wood, typically supports the upper run of
12 belt 42 and supports an exercising individual resting upon belt 42. Although deck 44 is
13 preferably of a cellulose material such as wood, various other types of material may be
14 used so long as deck 44 is capable of supporting belt 42 and a user exercising thereupon.

15 As best seen in Figure 4, in one embodiment, front pulley 38 is mechanically
16 coupled to an electric tread drive motor 46 by way of pulleys 48 and 50 and a drive belt 52.
17 In this illustrative embodiment, motor 46 further incorporates an inertial flywheel 54 that
18 controls fluctuations in the rotational motion of a shaft of motor 46 during operation of
19 treadmill 12. Motor 46 is optionally electrically coupled to a treadmill controller 56 that
20 controls the operation of motor 46, and thus the speed of belt 42, in response to various
21 user inputs or other control signals. As shown, treadmill controller 56 is incorporated
22 within tread base 26; however, it may be appreciated by one skilled in the art that treadmill
23
24

1 controller 56 may be incorporated within control panel 22 or alternatively within personal
2 computer 14.

3 In addition to the ability to control and vary the speed of belt 42, treadmill 12 also
4 permits the degree of incline of tread base 26 relative to the floor, or other surface upon
5 which tread base 26 rests, to be varied. Typically, this is accomplished through the use of
6 an incline drive motor 60 that rises or lowers one end of tread base 26 relative to the other
7 end. In the embodiment illustrated in Figures 2 through 5, tread base 26 includes a pair of
8 rear feet 62 and 64 that are rotatably attached to the rear of portion of side rails 34, 36. As
9 best seen in Figures 4 and 5, feet 62 and 64 are mechanically coupled through a shaft 66 to
10 incline drive motor 60, which causes feet 62 and 64 to pivot about their points of pivotal
11 attachment to side rails 34, 36, thereby selectively raising or lowering the rear end of tread
12 base 26 relative to the front end thereof. Motor 60 is also optionally electrically coupled
13 to, and controlled by the treadmill controller 56.

14 As shown in Figure 2, treadmill 12 (and optionally treadmill 20) includes control
15 panel 22 attached to side members 28, 30 of upright support structure 24. Control panel
16 22, in one embodiment, as shown in Figure 6, includes one or more interface devices.
17 Such interface devices may be either input devices or output devices. Input devices enable
18 a user to input and vary the operating parameters of treadmill 12. As examples of such
19 input devices, control panel 22 includes many typical controllers for use on an exercise
20 device, such as a treadmill. A number of illustrative input devices include but are not
21 limited to speed controls 68, incline controls 70, time controls 72, distance controls 74, a
22 start button 76, a stop or pause button 78, and heart rate controls 80. In addition to these
23 input devices, such as one or more controllers, control panel 22 further optionally includes
24

1 an iFit.com button 82, a manual override button 84, and a scaling control 86, each of which
2 are also examples of input devices. It may be appreciated that each of the above-recited
3 controllers or buttons may be embodied in a variety of different manners to perform their
4 commonly utilized function. In addition, each controller, button, and the like may take the
5 form of one or more switches, rheostats, potentiometers, touch sensitive controls, voice
6 activated controllers, and the like. The input devices described herein are examples of
7 structures capable of performing the function of interface means for gathering a first signal
8 (such as a real time signal) from the user. One skilled in the art may identify various other
9 configurations of interface means that are capable of performing the desired function.
10 Additionally, it may be appreciated that treadmill 20 may also include such interface
11 means.

12 As shown in Figure 6, iFit.com button 82, in one embodiment, acts as both a
13 selector and an indicator of connectivity of treadmill 12 to communication system 18, and
14 optionally treadmill 20, whether such connectivity is via translator device 13, computer 14,
15 or directly from treadmill 12. The iFit.com button 82 optionally includes an indicator light
16 (not shown) that demonstrates when a connection has been established between treadmill
17 12 and communication system 18, such as when iFit.com button 82 is depressed.
18 Alternatively, a light emitting diode (LED) positioned in close proximity to iFit.com
19 button 82 may be activated when iFit.com button 82 is activated.

20 The connection achieved by activating iFit.com button 82 may be via a variety of
21 communication line connections. For example, as shown, control panel 22 includes a
22 wireless port 105 that enables treadmill 12 to wirelessly communicate with network 16
23 (Figure 1), either directly or via computer 14 and/or translator device 13. Alternatively,
24

1 wireless port 105 may be located on tread base 26. Various other types of port or interface
2 may be included within treadmill 12 to enable communication via one or more
3 communication line connections. For example, treadmill 12 may include one or more
4 ports and interfaces to enable communication line connection through existing broadcast
5 technology, including television broadcast over the airwaves, cable or cable modems,
6 satellite, telephone lines, whether analog or digitally based, the internet, DSL, G-Lite,
7 wireless technology, infra-red (IR) technology, other high-speed data connections, or any
8 other suitable transmission technology or medium. Optionally, a communication port on a
9 user treadmill may enable communication directly with another treadmill (such as in a
10 master/slave scenario), whether or not such communication utilizes a network.

11 In one embodiment, by activating iFit.com button 82, a user of treadmill 12, or
12 other exercise device, connects to communication system 18, such as a website. Such
13 connection may be via an independently located computer, such as computer 14, through
14 translator device 13 or directly through a local area network (LAN) or wide area network
15 (WAN) by way of the described communication line connections for example, or other
16 connections known to one skilled in the art.

17 More specifically, by activating the iFit.com button 82 a signal is transmitted to
18 communication system 18 to create a connection therebetween. In this manner, treadmill
19 12 may receive signals representative of exercise programming from communication
20 system 18. Additionally, the connection with communication system 18 enables the user
21 to obtain the services of a stored trainer or a personal trainer to perform programming, ask
22 questions, download or access programming materials, surf the web, gather and send
23 electronic mail messages ("e-mail"), listen to audio programming, view video
24

1 programming, review and update user information and statistics, load user statistics,
2 purchase exercise programming, equipment, and materials, update exercise device software
3 and operating parameters, research exercise materials, and the like.

4 Furthermore, activation of the connection with communication system 18 enables
5 treadmill 12, or other exercise device, to have the potential of being controlled during an
6 exercise program by a third party, whether that third party is another personal trainer using
7 another treadmill 20, a stored communication system 18, or some other individual,
8 hardware, or software modules or components. For example, a third party individual or a
9 stored third party trainer may operate a console controlling the operation of one or more
10 exercise devices in a group class setting, including devices operated by a live or stored
11 trainer and by trainee users. This may be useful in a spinning class or other class in which
12 a trainer trains trainee users. In one embodiment, as the third party controls the operation
13 of the exercise devices, the trainer can communicate motivational messages to the trainee
14 users.

15 Similarly, activation of the connection with network 16 and/or communication
16 system 18 enables one or more users to interact one with another, and optionally compete
17 one against another as shall be described in detail hereinafter. For example, a first user on
18 treadmill 12a may receive information regarding the workout performed by a second user
19 on treadmill 12n via network 16 and/or communication system 18, then compete against
20 the second user and vice versa. This competition may be live on live or time adjusted, e.g.,
21 a workout recorded previously by the second user which the first user competes against.
22 Greater information about communication system 18, with its associated modules and
23 components will be discussed in detail hereinafter.

24

1 As mentioned above, control panel 22 may include manual override button 84.
2 Manual override button 84 enables a user to override an action initiated by (i) a live trainer
3 or (ii) a stored trainer, such as communication system 18, stored programming that is
4 located within the memory of computer 14, or alternatively in memory stored in treadmill
5 12. For example, if the exercise program accessed through communication system 18 is
6 too difficult for the user, the user may activate manual override button 84 thereby
7 interrupting the program delivered to treadmill 12 by communication system 18.
8 Furthermore, in the event that the exercise program is too easy, the user may increase the
9 difficulty level of the exercise device. Consequently, manual override button 84 provides
10 the user with a safety switch during operation of treadmill 12. In an alternate configuration
11 of treadmill 12, the functionality of manual override button 84 is activated upon manual
12 activation of one of the other input devices, such as but not limited to, incline controls 74,
13 speed controls 76, stop/pause button 78, and the like.

14 Similar to the operation of manual override button 84, scaling control 86 enables a
15 user to vary the operating parameters of treadmill 12 during an exercise program initiated
16 externally to treadmill 12. A user may activate scaling control 86 and vary the intensity of
17 an exercise program. The scaling control 86, therefore, enables a user to select a value
18 representative of the proportional change to be made to the control signal received by the
19 communicating mechanism of treadmill 12 from communication system 18. For example,
20 if an exercise program requires a maximum speed of 6 miles per hour (mph) with a
21 maximum incline of 15 degrees for a period of 30 minutes, an individual may activate
22 scaling control 86 to require only 66% intensity of the exercise program; stated otherwise,
23 reduce the intensity by one third. Therefore, the exercise program is varied to a maximum
24

1 speed of 4 mph, with a maximum incline of 10 degrees, for a period of 20 minutes.
2 Optionally, scaling control 86 may enable the user to set maximum values for each
3 operating parameter of treadmill 12. In another configuration, scaling control 86 may
4 enable the user to scale only one operating parameter of treadmill 12 while leaving other
5 parameters unchanged. Hence, the user may vary the exercise program to their particular
6 abilities, while obtaining the beneficial effects of exercising.

7 As another example of an input device of the present invention, control panel 22
8 may include a diagnostic control 88. Upon activation of diagnostic control 88, whether be
9 depressing a button or by some other manner known to one skilled in the art, treadmill 12
10 communicates with communication system 18 to check the operating status of the exercise
11 device. Communication system 18, thereby sends signals to the internal hardware and
12 software modules of treadmill 12 to verify that the modules are operating within the
13 desired specifications or to determine whether treadmill 12 may include software for which
14 an update is available. In one embodiment, in the event that one or more of the hardware
15 and/or software modules are damaged or not performing as required, communication
16 system 18 may download one or more software updates from communication system 18 if
17 possible. Alternatively, communication system 18 may inform the user that an error has
18 occurred and advise that the user obtain maintenance of the hardware components of
19 treadmill 12.

20 As additional examples of input devices, according to another aspect of the present
21 invention, control panel 22 may include an audio input device 90 and a video input device
22 92. Audio and video input devices 90, 92 enable a user to perform communication, such as
23 real time communication, with other users of exercise devices, via communication system
24

1 18 (Figure 1). The audio and video input devices 90, 92 also enable the user to hear and/or
2 watch (i) a live trainer or (ii) a stored trainer, such as recorded programs, educational
3 programming, entertainment programming, and the like. The diagnostic control 88, audio
4 input device 90 and video input device 92, therefore, are structures capable of performing
5 the function of interface means, communicating with the exercise mechanism, for
6 gathering a first signal from the user. Various other configurations of such interface means
7 are known to one skilled in the art in view of the teachings contained herein.

8 In one embodiment, audio input device 90 may take the form of a microphone,
9 while video input device 92 may take the form of a video camera. Audio input device 90
10 and video input device 92 may alternatively take various other configurations as known by
11 one skilled in the art. For example, audio input device 90 may be a microphone detachable
12 connected to control panel 22 or another part of treadmill 12. In another configuration,
13 audio input device 90 may be located distant from treadmill 12, while being capable of
14 gathering the audio inputs from the user. In still another configuration, audio input device
15 90 may be eliminated from treadmill 12, while treadmill 12 includes an audio jack, such as
16 an RCA-type audio jack, RJ-type jacks, digital audio jack, and the like. In still another
17 configuration, audio input device 90 may be a radio frequency (RF), infra red (IR), or
18 wireless type microphone. Similarly, video input device 92 may have the configuration of
19 a digital video camera integrally formed within control panel 22. Alternatively, video
20 input device 92 may be detachably connected to control panel 22 or another part of
21 treadmill 12, such as wireless digital cameras. Still in another configuration, video input
22 device 92 may be located distant from treadmill 12, while being capable of gathering the
23 requisite video signals to be transmitted to communication system 18 (Figure 1).
24

1 In addition to the above-described audio and video input devices 90, 92
2 respectively, control panel 22 may include a variety of other input devices. For example,
3 control panel 22 may include an integrally formed mouse 100. Additionally, control panel
4 22 may include a keyboard jack 102 for an external keyboard 103, a controller port 104 for
5 receiving one of a variety of game controller, an integrally formed mouse 100, a touch-
6 sensitive video display, and various other ports, jacks, or the like to receive various other
7 external components. Each input device is adapted to allow a user operating treadmill 12
8 to more fully operate one or more operating parameters of treadmill 12. Furthermore, the
9 input devices enable the user to access communication system 18 and/or obtain
10 educational, entertainment, or other information via network 16, whether such information
11 is from communication system 18 or from one of a variety of other hardware and/or
12 software modules that are accessible via network 16. For example, the input devices may
13 allow the user to surf the Internet to find educational materials or entertainment. These
14 additional input devices are further examples of are structures capable of performing the
15 function of interface means, communicating with the exercise mechanism, for gathering a
16 first signal from the user.

17 Control panel 22, in one embodiment includes one or more output devices that
18 provide a visual and optionally an audio indication of the operational status of treadmill 12
19 to the user. As with the input devices, the output devices may have various configurations
20 and perform numerous functions. Generally, the output devices described herein are each
21 structures capable of performing the function of means for reproducing a signal. The
22 output devices and hence the means for reproducing a signal may have various
23 configurations as known to one skilled in the art in view of the teaching contained herein.
24

1 In one embodiment, one video output device 94 may be a video display. Generally, video
2 output device 94 presents the user of treadmill 12 with information and data transmitted
3 from communication system 18, whether such data is live transmission from treadmill 20,
4 or alternatively stored programming accessible by communication system 18.
5 Additionally, video output device 94 may optionally show information and data from: (1)
6 various other sources selected by the user, third parties, or system 10; (2) statistical
7 information representative of the operational parameters of treadmill 12, such as the speed,
8 incline, duration of user's workout, etc.; (3) electronic mail messages (e-mail), and the like.
9 Video output device 94, in one embodiment is a liquid crystal display (LCD) or cathode
10 ray tube (CRT) display.

11 One skilled in the art may appreciate that various other devices may be used to
12 perform the functions of video output device 94. For example, video output device 94
13 maybe an electroluminescent display (ELD), a gas-plasma display, a thin film transistor
14 (TFT) display, a virtual reality (VR) display, and the like. In another embodiment of the
15 present invention, control panel 22 includes multiple video output devices 94. In still
16 another embodiment, video output device 94 is adapted to permit split screen or layered
17 images that are associated with picture-in-picture viewing of various images and
18 information. For example, video output device 94 may allow a user to watch various types
19 of entertainment and/or surf the Internet, while receiving images representative of the
20 exercise profile that they are following whether continuously, periodically, upon activation
21 of a user control, or the like.

22 As shown in Figure 6, in one embodiment of the present invention, control panel 22
23 includes an audio output device 96, such as a speaker. Audio output device 96 performs a
24

As shown in Figure 1, communicating with treadmill 12 via personal computer 14 is communication system 18 and treadmill 20. Those skilled in the art will appreciate that

1 computer 14 may take various configurations, including personal computers, hand-held
2 devices, multi-processor systems, microprocessor-based or programmable consumer
3 electronics, telephones, network PCs, minicomputers, mainframe computers, and the like.
4 Additionally, computer 14 may be part of a distributed computer environment where tasks
5 are performed by local and remote processing devices that are linked (either by hardwired
6 links, wireless links, or by a combination of hardwired or wireless links) through a
7 communications network, such as network 16. Furthermore, as suggested earlier, treadmill
8 12 may optionally incorporate the functionality of personal computer 14 therein or include
9 one or more modules or components of computer 14 while not incorporating all the
10 modules and components of computer 14.

11 The following discussion will focus on certain examples of alternate structures that
12 may be used as computer 14; however it is understood that a similar discussion may be
13 made for the hardware and/or software modules and components associated with
14 communication system 18, treadmill 20, and/or a third party 21. Furthermore, it may be
15 appreciated that treadmill 12, treadmill 20, communication system 18 and third party 21
16 may incorporate portions of computer 14 as described herein and appreciated by one
17 skilled in the art in light of the teaching contained herein. Similarly, one skilled in the art
18 will recognize that treadmill 12 and/or communication system 18 may includes some or all
19 of the modules and components of computer 14.

20 Generally, computer 14 is configured to receive data from various portions of
21 treadmill 12 and deliver manipulated data to the hardware and/or software modules or
22 components associated with communication system 18 and/or treadmill 20 or other
23 treadmills 12a-n. In addition, computer 14 communicates with communication system 18
24

1 and retrieves audio, video, and control signals therefrom and provides these signals to
2 treadmill 12, whether or not the signals are initiated solely by communication system 18,
3 treadmill 20, a third party, or another treadmill 12a-12n. Computer 14 may, therefore, use
4 various types of interfaces to communicate with treadmill 12 and network 16. For
5 example, the interface may be a wireless interface thereby utilizing IR, RF, satellite, blue
6 tooth transmission and associated protocols. Alternatively, the interface may be a modem,
7 cable modem, ADSL connection, ISDN, Ethernet, or similar other connections, voice
8 activated, and the like.

9 Following herein after is a general discussion of possible modules and components
10 of computer 14. The following discussion is merely illustrative of modules and
11 components that may form computer 14. It is appreciated that some of the referenced
12 modules may be eliminated while other modules and components may be included within
13 computer 14, as known by those skilled in the art.

14 With reference now to Figure 7, in one embodiment of the present invention
15 computer 14 is a general-purpose-computing device, including a processing unit 110, a
16 computer memory 112, and a computer bus 124 that couples various computer components
17 including the computer memory 112 to the processing unit 110. The computer bus 124
18 may be any of several types of bus structures including a memory bus or memory
19 controller, a peripheral bus, and a local bus using any of a variety of bus architectures.
20 Additionally, when treadmill 12 includes computer 14 and/or translator 13 computer bus
21 124 may be an I²C bus, a SPI bus, a microwire bus, a microbus, and the like. Also,
22 computer bus 124 may use the CAN protocol, CSAFE 1 protocol, or some other protocol
23
24

1 known to one skilled in the art to allow communication between treadmill 12 and
2 communication system 18 and/or treadmill 20 either directly or through network 16.

3 The computer memory, in this particular embodiment, includes read only memory
4 (ROM) 126 and random access memory (RAM) 128. A basic input/output system (BIOS)
5 130, containing the basic routines that help transfer information between elements within
6 computer 14, such as during start-up, may be stored in ROM 126.

7 The computer 14 may also include a magnetic hard disk drive 132 for reading from
8 and writing to a magnetic hard disk 138, a magnetic disk drive 134 for reading from or
9 writing to a removable magnetic disk 140, and an optical disk drive 136 for reading from
10 or writing to removable optical disk 142 such as a CD-ROM or other optical media. The
11 magnetic hard disk drive 132, magnetic disk drive 134, and optical disk drive 136 are
12 connected to computer bus 124 by a hard disk drive interface 144, a magnetic disk drive-
13 interface 146, and an optical drive interface 148, respectively. The drives and their
14 associated computer-readable media provide nonvolatile storage of computer-executable
15 instructions, data structures, program modules, and other data for computer 14 as will be
16 discussed in detail hereinafter. Although the exemplary environment described herein may
17 employ a magnetic hard disk 138, a removable magnetic disk 140, and a removable optical
18 disk 142, other types of computer readable media for storing data can be used, including
19 magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, RAMs,
20 ROMs, and the like.

21 Computer 14, in one embodiment, further includes program code means
22 comprising one or more program modules that may be stored on hard disk 138, magnetic
23 disk 140, optical disk 142, ROM 126 or RAM 128, including an operating system 150, one
24

1 or more application programs 152, other program modules 154, and program data 156. A
2 user may enter commands and information into computer 14, in one embodiment, through
3 a keyboard 160, pointing device 162, or other input devices (not shown), such as but not
4 limited to microphones, joy sticks, game pads, satellite dishes, scanners, video cameras,
5 potentiometers, buttons, switches, rheostats, or the like, whether such devices are
6 incorporated within treadmill 12 or in communication with translator device 13 and/or
7 computer 14. These and other input devices are often connected to processing unit 110
8 through a serial port interface 164 coupled to computer bus 124. Alternatively, the input
9 devices may be connected by other interfaces, such as a parallel port, a game port, or a
10 universal serial bus (USB), and the like. A monitor 166 or another video display device,
11 such as those described herein is optionally connected to computer bus 124 via an
12 interface, such as video adapter 168. In addition to the monitor, personal computer 14 may
13 include other peripheral output devices (not shown), such as one or more speakers, and
14 printers for obtaining recent statistical information regarding the user's workouts.

15 The computer 14, as depicted in this illustrative embodiment, may operate in a
16 networked environment using logical connections to one or more remote computers, such
17 as remote computer 170. The computer 14 may also communicate with treadmill 12 via a
18 LAN and optionally communicate with communication system 18 and treadmill 20 via a
19 WAN and optionally remote computer 170. Generally, each remote computer 170,
20 communication system 18, and treadmill 12, 20 may be or include the structure and
21 perform the function of another personal computer, a server, a router, a network PC, a peer
22 device, or other common network node, and typically includes many or all of the elements
23 described above relative to computer 14, although only one memory storage device 172
24

1 and its associated application program 174 has been illustrated in Figure 7. The logical
2 connections depicted in Figure 7 include local area network (LAN) 176 and a wide area
3 network (WAN) 178 that are presented here by way of example and not limitation. Such
4 networking environments are commonplace in office-wide or enterprise-wide computer
5 networks, intranets and the Internet.

6 When used in a LAN networking environment, typically computer 14 is connected
7 to the local network 176 through a network interface or adapter 180 that communicates via
8 one of a variety of communication line connections, such as those described previously.
9 When used in a WAN networking environment such that computer 14 may communicate
10 with communication system 18, computer 14 may include a modem 182, a wireless link, or
11 other means for establishing communications over the wide area network 178, such as the
12 Internet. The modem 182, which may be internal or external, is connected to computer bus
13 124 via serial port interface 164. In a networked environment, program modules depicted
14 relative to computer 14, or portions thereof, may be stored in the remote memory storage
15 device. It will be appreciated that the network connections shown are exemplary and other
16 means for establishing communications over wide area network 178 may be used.

17 Various transmission or communication protocols may be used to enable computer
18 14 to receive and transmit data through network 16. In one embodiment of the present
19 invention, computer 14, and more specifically, network interface 180 or serial port
20 interface 164, may use TCP/IP communication protocol. Alternatively, computer 14 may
21 use connection orientated or connectionless networks via asynchronous transfer mode
22 (ATM) technology, X.25 protocol, Frame Relay protocol, packet switching protocols,
23 circuit switching protocols, dynamic packet switching protocols, 802.11RF protocol, home
24

Generally, the packet contains the destination address in addition to the data. Each packet may be transmitted individually or may be combined or pooled with other packets of data going to similar destinations, such as audio data, video data and/or control signals. The packets of data or pooled data are optionally compressed and encapsulated for transceiving across network 16, where each packet may follow different routes to its destination. Once all the packets of a specific data message arrive at the destination, they are decompiled and deencapsulated into the original data. The packets may be prioritized according to content so that certain packets of data are delivered to computer 14, and hence treadmill 12, through network 16 faster than the other packets of data. For example, in a live-on-live exercise program situation audio and video data or signals are transceived faster than the control signals. Therefore, according to one embodiment, an individual may communicate with a trainer in real time without the need to interrupt the real-time communication between the trainer and the user so that one or more control signals may be delivered to the exercise device. An advantage of packetizing data, therefore, is that computer 14, translator device 13, and/or treadmill 12 may optimize its performance

1 according to the available bandwidth of the communication connection line with network
2 16 without the need to interrupt the real-time communication between a user and a trainer.

3 The discussion above describes a computer detached from treadmill 12; however,
4 as appreciated and stated earlier, all or portions of computer 14 may be optionally
5 incorporated within treadmill 12. As such, some or all of the various elements of computer
6 14 may be incorporated within control panel 22, or alternatively within tread base 26. In
7 various other configurations of the present invention, therefore, control panel 22 may
8 include one or more magnetic hard disk drives, magnetic disk drives, optical disk drives,
9 and associated interfaces. Control 22, therefore, may be capable of accessing programming
10 that is stored on computer diskettes, CD ROMs, DVDs, and the like. Additionally, control
11 panel 22 may optionally include a keypad integrally formed therein, or optionally include a
12 standard keyboard interface that may enable a user to communicate with treadmill 12. The
13 keypads and keyboard enable the user to control the operation of treadmill 12, and
14 optionally communicate with communication system 18 and other hardware and/or
15 software modules that may be accessible via network 16.

16 As depicted in Figure 1, computer 14 may optionally communicate with translator
17 device 13 that is configured to manipulate signals transmitted and received between
18 computer 14 and treadmill 12. Specifically, translator device 13 may be used when
19 computer 14 and treadmill 12 are incapable of directly communicating one with another.
20 Translator device 13 includes one or more processors that convert the signals passed
21 therethrough to a form that the device to receive such signals might understand. For
22 example, computer 14 may communicate with translator device 13 via a serial connection,
23 while treadmill 12 may only communicate with devices that deliver data via a serial I²C
24

1 connection or protocol. As such, translator device 13 is configured to manipulate the serial
2 signal received from computer 14 into a signal capable of being delivered via a serial I²C
3 connection or bus.

4 It may be appreciated by one skilled in the art that translator device 13 may convert
5 various types of signal to various other forms capable of being transmitted to various
6 interfaces. For example, translator device 13 may use a SPI bus, a microwire bus, a
7 microbus, a CAN protocol, a CSAFE 1 protocol, a home network protocol, TCP/IP
8 communication protocol, an asynchronous transfer mode (ATM) technology, X.25
9 protocol, Frame Relay protocol, packet switching protocols, circuit switching protocols,
10 dynamic packet switching protocols, 802.11RF protocol, serial, parallel, USB, or wireless
11 connection, and the like. Additionally, the structure and function of translator device 13
12 may be completely or partially incorporated within treadmill 12, computer 14, or a
13 combination thereof.

14 Generally, computer 14 and/or translator device 13, collectively and/or individually
15 are examples of a communicating mechanism, communicating with the interface means
16 (e.g., the input devices of console 22 that gather a signal from the user). In one
17 embodiment, the communicating mechanism enables real-time transmission of a first
18 signal to: a live trainer (e.g., on treadmill 20), a stored trainer (e.g., communication system
19 18), another user, or a third party 21, for example. The communicating mechanism may
20 also receive a packetized second real-time signal from any of these sources.

21 The second real-time signal may be an audio or visual signal directed to the user
22 and/or a control signal directed to a device, such as an exercise device 12, for example.
23 The audio and/or visual signal and the control signal may come from the same source, such
24

1 as a trainer 20. In one embodiment, however, the second real time signal comprises an
2 audio and/or visual signal from one source and a control signal from another source. For
3 example, the audio and/or signal may come from a live trainer, while the control signal
4 may come from a website or vice versa. Optionally, the audio, visual, and control signals
5 are each directed both to the user and to the exercise device, such as when the control
6 signal is an audible signal directed to a microphone connected to the device.

7 Computers 14 and/or translator device 13 portions are collectively or individually
8 examples of a communicating mechanism. Additionally, when portions of one more
9 computers 14 and/or translator devices 13 are incorporated within treadmill 12, such
10 portions are collectively or individually examples of a communicating mechanism.
11 Examples of such a communicating mechanism of the present invention may comprise (i) a
12 single structure that enables transmission of the first signal and/or receives the packetized
13 second signal or (ii) a first structure that enables transmission of the first signal and a
14 separate second structure that receives the packetized second signal. Any of these
15 communicating mechanisms are examples of structures capable of performing the function
16 of communicating means, communicating with the interface means, for receiving a
17 packetized second signal (such as a real time signal), and optionally, for enabling
18 transmission of the first signal (such as a real time signal).

19 In one embodiment, the communicating means only receives the second signal.
20 For example, upon merely activating a user input device, such as by turning the power of
21 the exercise device or other device on, a first signal is "gathered from the user," but is not
22 transmitted. Instead, the first signal merely activates the power and enables the
23 communicating mechanism to receive any second packetized signal that may be broadcast
24

1 to the exercise device. Such a broadcast may be from a communication system 18, such as
2 by wireless transmission, RF transmission, or other means known to those skilled in the
3 art. In another embodiment, the communicating mechanism transmits the first signal and
4 receives the second signal.

5 Additionally, computer 14 and/or translator device 13, collectively and/or
6 individually are examples of structures capable of performing the function of control
7 means, communicating with the exercise mechanism, for receiving one or more packetized
8 control signals from the communication system indicative of the selected exercise program
9 and for changing one or more operating parameters of the exercise mechanism based upon
10 the selected exercise program and the one or more packetized control signals.

11 As discussed above with respect to Figure 1, computer 14 may transceive one or
12 more signals to and from communication system 18 through network 16. Referring now to
13 Figure 8, a schematic block diagram of communication system 18 is illustrated. For
14 simplicity, only the most relevant hardware components are illustrated in Figure 8. It may
15 be appreciated by one skilled in the art that various other components may be included
16 within communication system 18 depending on the particular use and function of
17 communication system 18.

18 As depicted, communication system 18 includes an interface 190 that
19 communicates with a control processor 192 and an interface 198. Interface 190 is
20 configured to transceive one or more signals to and from computer 14 and treadmill 12 via
21 network 16. Such signals may include audio and visual signals of the user exercising, the
22 status of the exercise device, such as active status, deactivated status, standby status, data
23 and information about the user, such as heart rate, blood pressure, and the like that has
24

1 been gathered by one or more health monitoring devices. Such devices may include but
2 are not limited to electrodes, transducer, other ECG monitoring devices, a pulse watch, a
3 heart rate monitor, an EKG electronic detection device, an ECG electronic detection
4 device, and the like. Similarly, interface 198 enables communication system 18 to transmit
5 the above signals to and receive various signals from a trainer at treadmill 20 via network
6 16 (Figure 1). Such received signals may include audio, visual, and/or control signals.
7 Alternatively, the trainer at treadmill 20 may receive no signals, in the case where
8 communication system 18 controls treadmill 12 without a trainer at treadmill 20.

9 Each interface 190, 198 therefore, may be of a variety of types depending on the
10 particular communication line connection used in system 10 and the particular
11 transmission protocols used by computer 14, treadmill 12, translator device 13, or treadmill
12 20. For example, interfaces 190, 198 may be a wireless interface, may use infrared (IR),
13 radio frequency (RF), microwave technology, satellite, blue tooth transmission, home
14 network protocols, or various other protocols and technology as known by one skilled in
15 the art. Alternatively, interfaces 190, 198 may be a modem, cable modem, ADSL
16 connection, ISDN, Ethernet, or similar other connections. Interfaces 190, 198 either solely
17 or in combination with the other elements of communication system 18, may use various
18 transmission protocols to transceive data between treadmill 12 and treadmill 20 via
19 communication system 18. It may be appreciated by one skilled in the art that interfaces
20 190, 198 need not be the same, so long as they may communicate with control processor
21 192, and the other appropriate elements of system 10.

22 Communicating with interface 190 and interface 198 is a control processor 192.
23 Control processor 192 is configured to transceive signals through interface 190 and
24

1 manipulates the same based on selected programming selected by: (i) the user; (ii) a trainer
2 located at treadmill 20; (iii) a third party; or (iv) a combination thereof. Subsequently,
3 control processor 192, optionally in combination within interface 190 or 198, prepares the
4 selected programming (i.e., audio and video signals with associated control signals, if any)
5 for transmission to treadmill 12 and 20. Control processor 192 also preferably "packetizes"
6 the programming so that packets of information may be "streamed" or downloaded
7 through respective interfaces 190, 198 to computer 14, and subsequently treadmill 12, or to
8 treadmill 20. Each packet of data may sent individually, and may follow a different path
9 across network 16 to reach computer 14 (or treadmill 12). Upon reaching computer 14 (or
10 treadmill 12 or 20), the data may be "buffered" so that the data may be delivered to the
11 user or trainer in real-time.

12 Generally, control processor 192 may include one or more micro-controllers,
13 central processing units, state machines, programmable logic arrays, network logical
14 arrays, or gates, ASIC processors, software-based controllers, combination logic,
15 combinations thereof, and a variety of other controllers known by one skilled in the art to
16 manipulate data transceived between treadmill 12, communication system 18, and/or
17 treadmill 20.

18 Control processor is one example of a structure capable of performing the function
19 of means for synchronizing and packetizing the controls signals with the programming and
20 delivering the packetized control signal to the user device. It may be appreciated that
21 various other control processors and means are appropriate and known to those skilled in
22 the art.
23
24

Communicating with control process 192 is memory 194 and external memory 196. As shown, external memory 196 is optionally included, depending on the particular data storage needs of communication system 18. For example, memory 194 and/or external memory 196 may include physical information regarding the operation of treadmill 12. Additionally, memory 194 and/or external memory 196 may be one structure capable of performing the function of storage means for storing programming. Memory 194 and/or external memory 196 may, therefore, include or be configured to access one or more audiocassette tapes, compact disks (CDs), mini disks (MDs), computer diskettes, videotapes, laser disks (LDs), digital videodisks (DVDs), computer diskettes, or such other media capable of storing audio and/or video programming, with associated control signals. Additionally, memory 194 and/or external memory 196 may store a particular set of control signals in synchronization with the above-recited audio and video media programming. In light of the teaching contained herein, it may be appreciated by one skilled in the art, that either memory 194 and/or external memory 196 may take the form of or include a database structure that enables access to the various programming stored therein.

Also communicating with control processor 192 is control signal generator 200. Control signal generator 200 includes circuitry and/or software to generate the control signals that are synchronized with the audio and video programming retrieved from memory 194 and/or external memory 196 or alternatively transmitted from treadmill 20 through interface 198. Therefore, control signal generator 200 may include one or more micro-controllers, central processing units, state machines, programmable logic arrays, network logical arrays, or gates, ASIC processors, software-based controllers, combination

1 logic, combinations thereof, and a variety of other controllers known by one skilled in the
2 art to generate one or more control signals.

3 Control signal generator 200 is one structure capable of performing the function of
4 means for generating one or more control signals. One skilled in the art may identify
5 various other configurations of means for generating one or more control signals.

6 Various configurations are applicable for encoding a control signal on a carrier
7 signal included with the audio and video programming. Following hereinafter is a
8 discussion of one format for encoding the control signals will now be discussed. It should
9 be understood that the method of encoding set forth herein is representative only and is not
10 intended to limit the scope of this invention or to limit the various other alternative means
11 or methods by which a control signal may be transmitted to treadmill 12 and/or optionally
12 treadmill 20. Additionally, any number of encoding schemes, which are known to those
13 skilled in the art, may be used to carry out the desired function and are encompassed
14 within, the scope of the present invention.

15 In one embodiment, the control signals generated by control signal generator 200
16 are carried on a two (2) kHz carrier signal, with each control signal consisting of two
17 transmission bursts, each burst having three bytes of data. The second burst is intended to
18 exactly duplicate the first burst for error checking purposes. The first byte of data of each
19 burst, generated by control signal generator 200, in this illustrative embodiment, indicates
20 the desired speed of the treadmill, while the second byte of data indicates the desired
21 incline of the tread base 26, and the third byte is a check sum of the first and second bytes.
22 For other exercise devices the first and second bytes may represent other operating
23 parameters, like resistance of an elliptical device or cycle device. It may be appreciated
24

1 that each burst may include less or more than 3 bytes of data, depending on the different
2 type of device that communicates with communication system 18. As configured, the
3 control signal uses a standard RS-232 protocol. Alternatively, control signals may also use
4 other serial or parallel protocols, such as RS-422, RS-423, universal serial bus (USB) and
5 various other communication protocols known by one skilled in the art in light of the
6 teaching contained herein.

7 In one embodiment, each control signal includes both the first burst and the second
8 burst. Generally, the control signal is typically left in one quarter second in duration. Each
9 byte consists of eight bits of data, giving a high degree of resolution for controlling the
10 exercise device operating parameters, such as treadmill speed and the degree of incline. In
11 one embodiment, each time a control signal is inserted into the programming, the control
12 signal entirely suppresses the audio portion of the programming for the duration of the
13 control signal. Alternatively, and more preferably, the control signal does not entirely
14 suppress the audio portion of the programming. Rather the control signal is overlays the
15 programming so that the programming is uninterrupted. As a result, the control signals are
16 audible to the user which also provides an audible cue or warning to the user that one or
17 more operating parameters of treadmill 12 is about to change. Alternatively, the control
18 signals are inaudible to the user, but may be analyzed by computer 14 and/or treadmill 12.
19 The inaudible signals may, therefore, dictate an additional or alternate manners by which
20 the user is signaled of an impending change in one or more operating parameters of
21 treadmill 12. For example, in addition to an audio signal, the control signal may include a
22 video signal, such as a flashing red border that may appear around the exterior perimeter of
23 the video output device 94 and overlap the video display to inform the user of a change in
24

1 operating parameters of treadmill 12. It may be appreciated by one skilled in the art that a
2 combination of both audio and video indicators, whether or not the programming is
3 modified, such as the audio being eliminated, or the video being eliminated, may be used
4 to inform the user of an impending change in operating parameters.

5 As alluded to above, the control signals are detectable by computer 14 or treadmill
6 12, that verifies the control signal has the proper 2 kHz carrier frequency, checks to make
7 sure that the control signals otherwise properly formatted, and check for errors. If the
8 signal is approved, the signal is delivered to the appropriate controllers for varying the
9 operating parameters of treadmill 12.

10 Generally, the operation of communication system 18 varies depending on the
11 particular manner by which the programming is to be delivered to user on treadmill 12. In
12 one configuration, treadmill 20 is similarly configured to treadmill 12, previously
13 described. In such a case, when an individual wishes to perform an exercise program in
14 real-time with a distantly located trainer training on treadmill 20, the trainer, preceding the
15 scheduled exercise time, accesses or "logs on" to communication system 18. Upon
16 logging onto communication system 18, the trainer prepares the desired exercise program
17 or alternatively selects a stored control signal profile that is synchronized to the desired
18 program from memory 194 and/or external memory 196. At the scheduled time for a live-
19 on-live treadmill exercise program, both the user of treadmill 12 and the trainer located at
20 treadmill 20 accesses communication system 18. The trainer activates the control signal
21 profile, which is delivered to control processor 192. Control processor 192 delivers to both
22 treadmill 12 and treadmill 20 both the audio and/or video programming and the desired
23 control signals to vary the operating parameters of each treadmill 12, 20 in synchronization
24

1 with the audio and/or video programming. Control processor 192, optionally in
2 combination with interfaces 190, 198 prepares, the control signals with the audio and video
3 signals in accordance with the communication protocol that computer 14, translator device
4 13, treadmill 12 and/or treadmill 20 uses. Alternatively, control processor 192 may deliver
5 control signals to treadmill 12 to vary the operating parameters thereof, while sending an
6 audio and/or video representation of the exercise profile (i.e., speed, distance, time,
7 inclination of the exercise device) of the exercise program delivered to the user, so that the
8 trainer may then manually vary the operating parameters of treadmill 20 as desired. The
9 delivery of the programming including the control signal may be termed a packetized
10 second signal (preferably a packetized second real time signal).

11 In one embodiment, changes made by the trainer on treadmill 20 are translated into
12 control signals that are delivered to treadmill 12 to vary the operating parameters therein.
13 As such, treadmill 20 includes one or more sensors that identify changes made to the
14 operating parameters of treadmill 20 and deliver signals representative of such changes to
15 control processor 192. Upon receiving the sensed information, control processor 192
16 delivers a request to control signal generator 200. Control signals generator 200
17 subsequently generates a control signal associated with the actions taken by the trainer on
18 treadmill 20 and passes those signals through control processor 192, interface 190, and
19 optionally computer 14 to treadmill 12. The delivery of the programming including the
20 control signal may be termed a packetized second signal or a packetized second real time
21 signal.

22 In still yet another configuration, treadmill 20 is configured to include control
23 signal generator 200. In this particular configuration, as a trainer performs a programming
24

1 workout, whether such programming is stored on treadmill 20 or alternatively accessed
2 through communication system 18, control signal generator 200 creates the bursts of bytes
3 in accordance with changes made by trainer made on treadmill 20. As such, the control
4 signals are sent from treadmill 20 through interface 198 to control processor 192. Control
5 processor 192 then passes the control signals along with the audio and video programming,
6 through interface 190 to treadmill 12. The delivery of the programming including the
7 control signal may be termed a packetized second signal (preferably real time).

8 It may be appreciated by one skilled in the art, that the various above-described
9 configurations are only illustrative of the manner by which treadmill 20 may control the
10 operation of treadmill 12 either directly or alternatively indirectly through the use of
11 control signal generator 200 and the other components and modules of communication
12 system 18.

13 Following hereinafter, and depicted in Figure 9, is a function of block diagram of
14 one embodiment of treadmill 12. In this particular configuration, the functionality of
15 personal computer 14 is not incorporated within treadmill 12; however, as may be
16 appreciated by one skilled in the art, computer 14 may be incorporated within control panel
17 22 or other portions of treadmill 12. This embodiment enables true interactive
18 communication between a user operating treadmill 12 in his /her own home, and a personal
19 trainer located at a remote location, such as where treadmill 20 is located. Additionally,
20 the trainer may observe the user in real-time and control the user's treadmill 12 remotely
21 and in real-time via communication system 18 without interrupting the real-time audio and
22 video programming.

Signals from audio input device 90 and video input device 92 are delivered to an audio/video controller 212. Audio/video controller 212 is configured to manipulate the audio and video signals received from input devices 90, 92 in preparation for transmission to a processor 214. Audio/video controller 212, therefore, includes one or more amplifiers, micro-controllers, central processing units, state machines, programmable logic arrays, network local logical arrays, or gates, ASIC processors, software based controllers, combination logic, or combinations thereof to both manipulate audio and video signals that are to be transmitted or received by input devices 90, 92 and associated output devices 94, 96. Additionally, audio/video controller 212 may include memory, such as a buffer, to store and aid with real-time transmission and delivery of the audio and video signals. It may be appreciated by one skilled in the art that various audio/video controllers 212 are applicable and known in the art in light of the teaching contained herein.

1 Communicating with audio/video controller 212 is processor 214. Processor 214
2 converts the audio and video data received through audio/video controller 212 into the
3 desired form that is capable of being transmitted to communication system 18 via
4 communication interface 210. As such, processor 214 may perform various operations on
5 the data to be delivered to communication system 18, such as but not limited to, packing,
6 encrypting, splitting, and the like. Additionally, processor 214 may be configured to
7 perform various operations to data received from communication system 18, such as but
8 not limited to the reverse of the above operations. Generally, processor 214 may have
9 various configurations to perform the above-described function as known by one skilled in
10 the art. For example, processor 214 may take the form of one or more micro-controllers,
11 central processing unit (CPU), state machines, programmable logic arrays, or network of
12 logical gates, ASIC processor, software-based controllers, a combination of these
13 components, or a variety of other controllers.

14 According to another aspect of the present invention, processor 214 may receive
15 various inputs from one or more manually operated input devices 216, such as manual
16 override button 84, scaling controls 84, and other controls and buttons known to one
17 skilled in the art in light of the teaching contained herein. In response to such inputs,
18 processor 214 may vary the operating parameters of treadmill 12 and provide the user with
19 notification of such change in the operating parameters of treadmill 12 via output devices
20 218 and/or video output device 94 and audio output device 96. Processor 214, therefore, is
21 one structure capable of performing the function of means for controlling the operating
22 parameters of the exercise mechanism in real-time and one structure capable of performing
23 the function of control means for receiving one or more packetized control signals from a
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1 communication system indicative of a selected exercise program and changing one or more
2 operating parameters of the exercise mechanism based upon the selected exercise program
3 and the one or more packetized control signals.

4 Communicating with processor 214, in one embodiment, is communication
5 interface 210 that enables treadmill 12 to transceive data, such as packetized data, via a
6 communication line. Communication interface 210, in one embodiment, is a modem.
7 Depending on the particular communication manner used to communicate with
8 communication system 18, different communication interfaces 210 may be used at
9 different communication line connections. For example, the communication line
10 connection may include existing broadcast technology, including television broadcast over
11 the airwaves, cable or cable modems, satellite, telephone lines, whether analog or digitally
12 based, the internet, DSL, G-Lite, wireless technology, other high-speed data connections,
13 or any other suitable transmission technology or medium. As such, communication
14 interface 210 is compatible with existing conventional broadcast technologies and can
15 interface with existing audio and/or video components commonly found in homes, thereby
16 reducing the overall cost of the exercise device and reducing barriers to accessing
17 communication system 18.

18 Communicating with processor 214 and optionally communicating with
19 communication interface 210 is treadmill controller 56. As illustrated in Figure 9,
20 treadmill controller 56 communicates with control panel 22. Generally, treadmill
21 controller 56 may communicate with control panel 22 by an I²C bus, a SPI bus, a
22 microwire bus, a microbus, and the like.

1 In one embodiment, treadmill controller 56 includes a treadmill processor 220,
2 memory 222, and a control signal decoder 224. Treadmill processor 220 is configured to
3 control the operation of speed motor 226 and incline motor 228 that controls the speed and
4 incline of treadmill 12. Treadmill processor 220, therefore, is one structure capable of
5 performing the function of means for controlling the operating parameters of the exercise
6 mechanism in real-time and one structure capable of performing the function of control
7 means for receiving one or more packetized control signals from a communication system
8 indicative of a selected exercise program and changing one or more operating parameters
9 of the exercise mechanism based upon the selected exercise program and the one or more
10 packetized control signals.

11 Treadmill processor 220 is optionally controlled by processor 214 or by control
12 signal decoder 224 in response to the various signals received through communication
13 interface 210 from communication system 18. Alternatively, treadmill processor 220 may
14 be controlled by signals obtained from memory 222, via input devices 216, audio input
15 device 90 and video input device 92. Treadmill processor 220 may include various
16 components and modules to perform the desired function. For example, treadmill
17 processor 220 may include one or more micro-controllers, central processing unit (CPU),
18 state machines, programmable logic arrays, or network of logical gates, ASIC processor,
19 software-based controllers, combination logic, a combination of these components, or a
20 variety of other controllers.

21 Controller 212, processor 214, interface 210, and treadmill processor 220 are
22 collectively and individually examples of structures capable of performing the function of
23
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1 communicating means, communicating with the interface means, for receiving a
2 packetized second signal, and optionally, for enabling transmission of the first signal.

3 Both processor 214 and treadmill processor 220 are capable of receiving and
4 transmitting feedback signals from the various elements of treadmill 12, for example, feed
5 back from drive motor 226 and incline motor 228. Each processor 214, 220 is capable of
6 converting the feedback signals into signals for the video output device 94 or monitor 166
7 communicating with computer 14. The particular feedback signals received from speed
8 motor 226 and incline motor 228 may be stored in registers or memory modules.

9 Treadmill 12, as depicted, optionally includes one or more sensors, such as belt
10 speed sensor 230 and incline sensor 232. Each sensor 230, 232 gathers a particular
11 operating parameter of treadmill 12 (speed of belt 42 (Figure 4) and incline of tread base
12 26), such that control panel 22 may present outputs via the output devices that are
13 indicative of the present operating state of treadmill 12 at any given point in time.
14 Treadmill 12 may includes other sensors that gather various other operating parameters,
15 such as but not limited to, maximum pulse and heart rate, average pulse and heart rate,
16 target heart rate, length of workout session, and the like. Additionally, sensors 230, 232,
17 optionally in combination with one or more other sensors, may determine whether an
18 individual is actually exercising on treadmill 12 and deliver a feedback signal to processor
19 214 that informs communication system 18 and/or the trainer. Furthermore, sensors 230,
20 232, optionally in combination with one or more other sensors, may calculate whether the
21 individual is a juvenile and stop treadmill 12 in the event that the user is a juvenile.

22 As discussed earlier, system 10 enables a user of treadmill 20 to communicate with
23 and control one or more operating characteristics or parameters of treadmill 12. There are
24

1 various manners by which treadmill 12 may be controlled by communication system 18
2 solely or in combination with treadmill 20 or a third party. Following hereinafter is a
3 continued discussion of the operation of the illustrated embodiment of treadmill 12
4 depicted in Figure 9.

5 During operation of treadmill 12 a user initially inserts a dead-man key (not shown)
6 within port 98 of control panel 22 (Figure 6). Upon insertion of the dead-man key,
7 treadmill 12 is capable of being operated, i.e., power is allowed to flow to the various
8 internal and external components of treadmill 12 and treadmill 12 has an active status.
9 Once activated, a user may optionally connect to communication system 18 or use a stored
10 or manually defined exercise program or workout. In the event that the user wishes to
11 connect to communication system 18, in one embodiment, a user activates iFit.com button
12 82 (Figure 6), thereby initiating the hardware and/or software modules within either
13 treadmill 12 or computer 14 to create a connection with communication system 18.
14 Alternatively, upon placing treadmill 12 in active status, treadmill may automatically
15 connect to communication system 18.

16 Once a link is achieved and a user optionally has provided password and user
17 identification, a user may select either stored or live-on-live exercise programs. Following
18 the user selection, programming, whether live or stored is delivered (optionally in real
19 time) to communication interface 210 via one or more of a variety of communication line
20 connections, whether such connections are digital, analog, serial, parallel, or a combination
21 thereof. The particular configuration of communication interface 210 may vary based
22 upon the particular communication line connection used.

1 It may be appreciated by one skilled in the art that the exercise program may be
2 displayed to the user in a variety of manners, depending on the particular signals received
3 from communication system 18 or trainer device 20. For example, the programming may
4 include an exercise profile that periodically or continually appears on video output device
5 94. Alternatively, the programming may solely include the above-described exercise
6 profile, thereby enabling the user of treadmill 12 to view educational or entertainment
7 programming via video output device 94 during their exercise program.

8 Upon receiving the programming, communication interface 210 may optionally
9 deliver the audio signal to control signal decoder 224 that identifies the control signal. In
10 another setting, communication interface 210 may deliver both the audio and video signals,
11 with the control signal, to processor 214 for manipulation and distribution to the
12 appropriate hardware components, and/or software modules. Such delivery of
13 programming may be performed through use of a general-purpose bus or a variety of other
14 buses and protocols, such as an I²C bus, SPI bus, Microwire bus, Microbus, CAN protocol,
15 home network protocol, or the like. Additionally, the control signals, and the audio and the
16 video signals may be delivered using the CSAFE 1 protocol or equivalent thereof for
17 various other types of device not within the field of exercise devices.

18 When communication interface 210 delivers all signals to processor 210, processor
19 214 separates the audio, video, and control signals and optionally delivers them to
20 audio/video controller 212, control signal decoder 224, treadmill processor 220, or
21 memory 224. For example, in one configuration processor 214 may optionally deliver
22 portions of the audio and video signals control signal decoder 224, either directly or
23 through treadmill processor 220 such that the audio and video signals are “buffered” in
24

1 accordance with “streaming” technology. If the available bandwidth does not allow real-
2 time streaming of audio and video signals, video frames and the audio signals may be
3 separated and transceived so that a segmented display is provided with real-time audio
4 signals. Although segmenting of video frames is not preferred it is one possible
5 alternative method of streaming audio and video signals. In another configuration, upon
6 receiving the signals from processor 214, control signal decoder 224 may optionally store
7 the complete audio and video signals for an entire program before treadmill 12 may access
8 such signals. In yet another configuration, processor 214 may optionally deliver only the
9 audio signal and the control signal to treadmill processor 220 that may include the
10 functionality of control signal decoder 224 therein. The particular manner by which
11 treadmill processor 220 retrieves either the encoded control signal or the decoded control
12 signal may vary from configuration to configuration depending on the particular form of
13 treadmill 12.

14 Generally, control signal decoder 224 either individually or collectively with
15 processor 214 and/or treadmill processor 220 is one structure capable of performing the
16 function of means for decoding the control signal having an input and an output. One
17 skilled in the art may identify various other configurations of a means for decoding the
18 control signal having an input and an output. For example, treadmill processor 220
19 and/or processor 214 may include a control signal decoder and hence be a means for
20 decoding the control signal having an input and an output.

21 Following manipulation of the control signals to obtain the control instructions,
22 treadmill processor 220 performs the control process on the various components of
23 treadmill 12 as dictated by the control instructions. For example, treadmill processor 220
24

1 may cause motor 46 to speed up thereby accelerating belt 42 or alternatively cause motor
2 60 to rotate thereby raising or lowering tread base 26. Motors 46, 60 and 226, 228 are
3 structures capable of performing the function of means, electrically coupled to the output
4 of the decoding means for driving the moveable element in response to the decoded control
5 signal. It may be appreciated by one skilled in the art that the control instructions may
6 cause various other changes to the operating parameters of treadmill 12, and other devices.
7 Similarly, various means for driving the moveable element in response to the decoded
8 control signal. For example, the means may vary depending on the particular type of
9 exercise device used.

10 While treadmill processor 220 is either decoding the control signal from the audio
11 signal received from communication system 18 or merely activating speed motor 226
12 and/or incline motor 228, processor 214 delivers the audio and video signals received
13 through communication interface 210 to audio/video controller 212. Audio/video
14 controller 212 manipulates the signals received and passes the audio signal to audio output
15 device 96 and the video signal to video output device 94. Optionally, processor 214 may
16 send portions of the audio or video signals to the output devices 218 to provide the user
17 with multiple sources of representations of the current operating parameters of treadmill
18 12, or exercise device.

19 In another alternative configuration of the present invention, the audio, video, and
20 control signals received by communication interface 210 are delivered to processor 214 for
21 manipulation and delivery to audio/video controller 212. In such a case, the video data is
22 displayed on video output device 94 while the audio signal including the control signal is
23 transmitted to audio output device 96. In this configuration, audio input device 90 or a
24

1 second audio input device (not shown) is configured to receive various control signals that
2 are delivered by audio output device 96 and pass those back to processor 214. The control
3 signals are subsequently decoded and treadmill processor 220 may activate speed motor
4 226 and/or incline motor 228 in accordance with the delivered control signals.

5 Generally, communication interface 210, processor 214, audio/video controller
6 212, treadmill processor 220, and/or control signal decoder 224 are collectively and
7 individually examples of a controller, responsive to the packetized second signal,
8 configured to control the operating parameters of the exercise mechanism (preferably in
9 real time). Additionally, such controller is a structure capable of performing the function
10 of control means, communicating with the exercise mechanism, for receiving one or more
11 packetized control signals from the communication system indicative of the selected
12 exercise program and for changing one or more operating parameters of the exercise
13 mechanism based upon the selected exercise program and the one or more packetized
14 control signals. It may be appreciated by one skilled in the art that the control means may
15 have various other configurations.

16 Following hereinafter is a generalized discussion of a number of features of an
17 exercise system, exercise devices, methods, computer products, and computer readable
18 media associated with the teaching and disclosure of the present invention. Referring now
19 to Figures 10-19, a system 250 is illustrated. The majority of the features described with
20 respect to system 10, also apply to system 250.

21 Generally, this embodiment of the present invention may comprise one or more
22 hardware components, such as those described above and illustrated in Figure 1, 7, and 10,
23 and various special-purpose or general-purpose computers. Embodiments within the scope
24

1 of the present invention also include computer-readable media for carrying or having
2 computer-executable instructions or data structures stored thereon. Such computer-
3 readable media can be any available media that can be accessed by a general-purpose or
4 special-purpose computer and the hardware and/or software modules associated with
5 system 10 (Figure 1). By way of example, and not limitation, such computer-readable
6 media can comprise RAM, ROM, EEPROM, CD-ROM, or other optical disk storage,
7 magnetic disk storage, or other magnetic storage devices, or any other medium which may
8 be used to carry or store desired program code means in the form of computer-executable
9 instructions or data structures and which may be accessed by a general-purpose or special-
10 purpose computer. When information, such as one or more signals or programming is
11 transferred or provided over network 16 or another communications connection (either
12 hardwired, wireless, or a combination of hardwired or wireless) to treadmill 12, translator
13 device 13, computer 14, communication system 18, and /or treadmill 20, such devices
14 properly view the connection as a computer-readable medium. Thus, any such a
15 connection is properly termed a computer-readable medium. Combinations of the above
16 should also be included within the scope of computer-readable media. Computer-
17 executable instructions may include, for example, instructions and data which cause a
18 general-purpose computer, special-purpose computer, or special-purpose processing device
19 to perform a certain function or group of functions.

20 Although not required, the present invention will be described in the general
21 context of computer-executable instructions, such as program modules, that may be
22 executed by one or more computers in various network environments, such as within the
23 environments illustrated in Figures 1, 7, and 10. Generally, program modules include
24

1 routines, programs, objects, components, data structures, etc. that perform particular tasks
2 or implement particular abstract data types. Computer-executable instructions, associated
3 data structures, and program modules represent examples of program code means for
4 executing steps of the methods disclosed herein. The particular sequence of such
5 executable instructions or associated data structures represents examples of corresponding
6 acts for implementing the functions described in such steps.

7 According to this illustrative embodiment of the present invention, a distantly
8 located personal trainer performing an exercise on one treadmill in real-time may control
9 one or more operating parameters of an exercise device used by a user performing an
10 exercise program. However, it may be appreciated that the systems, methods, and devices
11 of the present invention may be implemented and utilized in various other situations and
12 with various other exercise devices or other devices unrelated to exercise devices. The
13 systems and methods of the present invention may be implemented using a variety of
14 hardware and/or software modules and include a variety of computer network
15 configurations, including but not limited to multiple computers and/or exercise devices that
16 are connected via the Internet, LANs, WANs, and the like.

17 To more easily explain the function and structures of system 250, reference will
18 now be made to Figure 10 that is a block diagram illustrating one embodiment of the
19 present invention. As shown, system 250, that is similar to system 10, includes a number
20 of user modules 252a-252n that represent, in this embodiment, multiple exercise devices,
21 translator devices 13, and/or computers 14, whether such exercise devices, translator
22 devices 13, and/or computers 14 are located in the same area, or distantly located one with
23 another, such as at a number of user's homes. Alternatively, as discussed earlier, user
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modules 252a-252n may take the form of various other devices known by one skilled in the art. For example, the exercise devices may include treadmill 12, ellipticals, cycles, steppers, hikers, climbers, Nordic type exercise devices, and other various types of exercise devices as known by one skilled in art.

Generally, user modules 252a-252n include one or more exercise mechanisms with one or more moveable elements that enable a user to exercise during an exercise program, whether such exercise program requires anaerobic exercise, aerobic exercise, or a combination thereof. Therefore, the modules of each user module 252a-252n may be structures capable of performing the functions of: (1) control means for receiving one or more packetized controls signals from the communication system (communication module) indicative of a selected exercise program and changing one or more operating parameters of the exercise mechanism based upon the selected exercise program and the packetized controls signals; (2) interface means, communicating with the exercise mechanism, for gathering a first real-time signal from the user; (3) communicating means, communicating with the interface means, for receiving a packetized second signal, and optionally, for enabling transmission of the first signal; (4) means for reproducing the second signal; (5) means for controlling the operating parameters of the exercise mechanism; (6) means for decoding the control signals; and (7) means for driving the moveable element in response to the decoded control signals.

In one embodiment, user modules 252a-252n communicate with a communication module 254, via network 16. In one embodiment, communication module 254 has a similar configuration to that of communication system 18 and is capable of transmitting and receiving data from user modules 252a-252n. As such, communication module 254 is

1 able to “transceive” information and data to and from the various modules, components,
2 and other hardware and/or software modules of system 250.

3 Generally, in one illustrative embodiment, communication module 254 is
4 configured to act as an intermediary module between user modules 252a-252n and the
5 various other modules of system 250. Communication module 254, therefore, enables user
6 modules 252a-252n to communicate with and select one or more exercise programs,
7 whether based on a live-on-live request or recorded exercise programs. The structures and
8 functions related to communication module 254 will be discussed in greater detail
9 hereinafter.

10 Optionally communicating with communication module 254 is one or more trainer
11 modules 256a-256n. As illustrated, communication module 254 is directly communicating
12 with trainer modules 256a-256n. Alternatively, trainer modules 256a-256n may
13 communicate with user modules 252a-n through network 16, therefore enabling user
14 modules 252a-252n to communicate with trainer modules 256a-256n through network 16
15 without interacting with communication module 254, such as illustrated in Figure 1, where
16 a user treadmill 12 may communicate directly with a trainer treadmill 20.

17 Trainer modules 256a-256n, in one illustrative embodiment, include the structures
18 and functions of treadmill 20. Generally, trainer modules 256a-256n include one or more
19 exercise mechanisms with one or more moveable elements that enable an individual to
20 exercise during and exercise program, whether such exercise program requires anaerobic
21 exercise, aerobic exercise, or a combination thereof. Additionally, trainer modules 256a-
22 256n are configured to enable a trainer, whether a physical therapist, personal trainer, or
23 the like to perform an exercise program substantially simultaneously with or without
24

1 substantial delay with users exercising through user modules 252a-252n. Furthermore,
2 trainer modules 256a-256n may include hardware and/or software modules and
3 components that enable trainer modules 256a-256n to control the exercise devices
4 incorporated within user module 252a-252n, such as treadmill 12. As such, trainer module
5 256a-256n may include various exercise devices commonly known by one skilled in the
6 art, and various hardware and/or software modules that enable the trainer to vary each user
7 module 252a-252n, whether individually, collectively, or subsets of the entire group of
8 user modules 252a-252n.

9 It may be appreciated by one skilled in the art that trainer modules 256a-256n may
10 take various other configurations as known by one skilled in the art, in view of the teaching
11 contained herein. For example, although trainer modules 256a-256n are depicted herein,
12 trainer modules 256a-256n may be substituted for one or more additional user modules
13 252a-252n. Therefore, system 250 may enable multiple users to interact one with another
14 through network 16, without the capability to control one another. As referenced
15 previously, it may be understood that system 10 may also enable multiple users to interact
16 one with another through network 16, without the capability to control one another.

17 Optionally communicating with communication module 254 is a third party control
18 module 258. Third party control module 258, in one embodiment, enables some third
19 party such as an additional personal trainer, medical provider, development team, and the
20 like to view the current exercise program, while having the ability to control various
21 operating properties of user modules 252a-252n and/or trainer modules 256a-256n. For
22 example, in a health club setting, third party control module 258 may take the form of a
23 console operated by an individual who is able to control the operating parameters of one or
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1 more exercise devices (e.g., during a spinning class), whether operated by a trainer or user,
2 during an exercise program. It may be appreciated by one skilled in the art that various
3 other configurations of third party control module 258 are applicable and known to one
4 skilled in the art, in view of the teachings contained herein.

5 Through the illustrative configuration of control system 250 depicted in Figure 10,
6 a user performing various exercise activities through user modules 252a-252n may
7 communicate with trainers using trainer modules 256a-256n in real-time communication.
8 Additionally, one user module 252a-252n may communicate with another user module
9 252a-252n without communicating with one of trainer modules 256a-256n.

10 Generally, communication module 254 may act as and take the form of a server,
11 with associated hardware and/or software modules to enable communication between the
12 various modules of the illustrated system 250. As such, user modules 252a-252n, trainer
13 modules 256a-256n, and third party control modules 210 may be considered clients of
14 communication module 254. Alternatively, a separate server or a server network,
15 illustrated in dotted lines and referenced by numeral 260 may communicate with
16 communication module 254. In such a case, communication module 254 acts as a client.
17 Generally, user modules 252a-252n, communication module 254, trainer modules 256a-
18 256n, and third party control 210 may communicate one with another, via various
19 communication line connections as discussed herein and known to one skilled in the art in
20 light of the teaching contained herein.

21 Reference is now made to Figure 11, which is a more detailed schematic diagram
22 of system 250. For ease of explanation, Figure 11 only shows one user module 252 and
23 one trainer module 256; however it may be appreciated by one skilled in the art that a
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similar discussion may be made for multiple users and trainer modules 252, 256 respectively.

As shown, in one embodiment, user module 252 includes a user interface 262. User interface 262 enables a user utilizing the beneficial characteristics of user module 252 to engage and give commands thereto with respect to various operating parameters of user module 252. For example, user interface 262 may include one or more interface devices as discussed previously, such as one or more audio and video input devices 90, 92 and one or more audio and video output devices 94, 96 as described earlier herein. Therefore, user interface 262 enables the user to visually and/or audibly communicate with the trainer manipulating personal trainer module 256, various other stored programming, or other users. Consequently, user interface 262 may incorporate various structures and functions of treadmill 12, and more specifically control panel 22. Furthermore, user interface 262 may incorporate various portions of translator device 13 and computer 14, such as but not limited to monitor 166, keyboard 160, mouse 162, and the like. User interface 262 is one structure capable of performing the function of interface means for gathering a first real-time signal from the user and also means for reproducing the second signal from the trainer.

It may be appreciated by one skilled in the art that user interface 262 and hence the interface means may take various forms or configurations to perform the desired function thereof. For example, user interface 262 and interface means may be a voice activated interface, a touch sensitive interface, an automatic monitoring system, such as a system that monitors heart rate, blood pressure, and the like and various other measurable parameters of user module 252 and a user exercising through user module 252.

1 User interface 262, in one embodiment, communicates with exercise module 264,
2 such as treadmill or other mechanisms having a movable element. Exercise module 264
3 includes various hardware and software components that enable an individual to obtain
4 aerobic exercise, anaerobic exercise, combinations thereof, or the like exercise program.
5 For example, in one embodiment exercise module 264 is treadmill 12 with computer 14
6 and translator device 13. Alternatively, exercise module 264 is treadmill 12 with
7 components of computer 14 and translator device 13 therein.

8 It may be appreciated that the various modules related to user module 252 may be
9 incorporated within exercise module 264, or more specifically within treadmill 12 or some
10 other device. In another configuration, exercise module 264 includes a movable element,
11 such as belt 42, that allows the user to exercise. In yet another configuration, exercise
12 module 264 may incorporate the structure and functionality associated with user interface
13 262 therein.

14 Communicating with exercise module 264 is a data storage module 266. Data
15 storage module 266, in one embodiment is a database of operating parameters for exercise
16 module 264 with respect to one or more exercise programs. As such, data storage module
17 266 may be a ASIC chip, programmable ROM, CD-ROM, EEPROM, PCMCIA card,
18 compact flash card, flash bios, dynamic memory, magnetic storage disk, optical storage
19 media, or the like. Additionally, data storage module 266 may be a hierarchal, relational,
20 or other typical database, including related database management systems (not shown).
21 Generally, data storage module 266 contains the necessary data and information to operate
22 exercise module 264 in accordance with a selected program by a user operating user
23 module 252 or alternatively to perform the necessary exercise program designated by the
24

1 operator of training module 256. Furthermore, data storage module 266 may store
2 programming retrieved from communication module 254 in preparation for activation of
3 exercise module 264 upon a request from a user, communication module 254, or trainer
4 module 256. Data storage module 266 may be incorporated within exercise module 264
5 such as when user interface 262, exercise module 264, and data storage module 266 are
6 part of treadmill 12, whether or not translator device 13 and/or computer 14 is integrally
7 formed therewith.

8 Communicating with exercise module 264 is a safety module 268. Safety module
9 268 optionally communicates with storage module 224. Safety module 268 is intermediate
10 between an interface module 270 and exercise module 264 and controls the data
11 transferred through network 16 from communication module 254. As such, safety module
12 268 tracks the information delivered from communication module 254 and automatically
13 engages a program stored within data storage module 266 upon disengagement of the
14 connection with communication module 254 through interface module 270, thereby
15 delivering one or more safety signals to exercise module 264. Alternatively, safety module
16 268 may maintain the operating parameters of exercise module 264 at the same level as
17 before disengagement of user module 252 from communication module 254, thereby
18 sending safety signals that maintain the operating parameters of exercise module 264 at the
19 same level as before interruption of the programming. In yet another configuration, safety
20 module 268 sends one or more safety signals that slowly decrease all the operating
21 parameters of exercise module 264 to either a user defined or communication module 254
22 defined base level or to zero upon disengagement of user module 252 from communication
23 module 254. As such, safety module 268 may include various hardware and/or software
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1 components and modules necessary to perform the desired function, such as but not limited
2 to a buffer to store programming received from communication module 254. Therefore,
3 safety module 268 is one example of a safety mechanism that is capable of manipulating
4 the operating parameters of the exercise mechanism in the event that a packetized second
5 control signal is interrupted. As such, safety mechanism may generate one or more safety
6 signals to operate the exercise mechanism, as discussed herein. Safety module 268 is
7 another example of communicating mechanism of the present invention.

8 Interface module 270, connected to safety module 268, manipulates the information
9 and data transceived through user interface 262, whether such data is to be delivered to
10 exercise module 264 or for delivery to communication module 254 through network 16.
11 As such, interface module 228 performs various operations on the data, such as but not
12 limited to encrypting data, decrypting data, buffering data, packetizing data, depacketizing
13 data, and the like. Interface module 270 is one example of a communicating mechanism,
14 communicating with the interface, the communicating mechanism enabling real-time
15 transmission of the first signal to a trainer, the communicating mechanism receiving a
16 packetized second real-time signal. In addition, interface module 270 is an example of
17 structure capable of performing the function of a communicating means, communicating
18 with the interface means, for receiving a packetized second signal, and optionally, for
19 enabling transmission of the first signal.

20 It may be appreciated by one skilled in the art that there are various other
21 configurations of interface module 270 and hence communicating means. For example,
22 interface module 270 may facilitate communication be data between one or more users
23 rather than between user module 252 and trainer module 256.
24

1 Generally, each of the modules referenced as being included within user module
2 252 may be integrally formed with treadmill 12 or exercise module 264. Those modules
3 may, alternatively, be added to or installed within an existing exercise device to allow the
4 same to communicate with communication module 254. Therefore, the particular
5 functions of each of the modules referenced within user module 252 may vary depending
6 on the particular characteristics and properties of the exercise device. Similarly, user
7 module 252 may include various other modules that may be appropriate, as understood and
8 may be identified by one skilled in the art.

9 User interface 262, safety module 268, data storage module 266, and/or interface
10 module 270 are examples of a controller, responsive to the packetized second real-time
11 signal, configured to control the operating parameters of the exercise mechanism (or
12 exercise module) in real time. Additionally, such controller is a structure capable of
13 performing the function of control means, communicating with the exercise mechanism (or
14 exercise module), for receiving one or more packetized control signals from the
15 communication system (or communication module) indicative of the selected exercise
16 program and for changing one or more operating parameters of the exercise mechanism (or
17 exercise module) based upon the selected exercise program and the one or more packetized
18 control signals. It may be appreciated by one skilled in the art that the control means may
19 have various other configurations.

20 Communicating with user module 252 via network 16 is communication module
21 254. As shown, communication module 254 includes a communication user interface
22 module 272 that transceives data, such as audio, video, and control signals between user
23 module 252 and communication module 254. Communication user interface module 272
24

Furthermore, control module 274, may automatically disconnect data communication between user module 252 and communication module 254 when the movable element of exercise module 264 is stopped by the user. For example, in a gym type setting, once an individual connects to communication module 254, and/or communication system 18, control module 274 provides access to communication module 254 with associated programming. As a user exercises, control module 274 tracks the

1 active status of the movable element of exercise module 264 to determine whether the user
2 is continually exercising. When the user activates, through user interface 262, stop/pause
3 button 78 (Figure 6), control module 274 disconnects the user from communication
4 module 254. Furthermore, control module 274 clears the temporary data file stored in
5 storage module 224 of user module 252 and may also clear the temporary data files stored
6 in communication module 254 that relate to the particular user. In this way, control
7 module 274 prepares user module 252 and communication module 254 for use by
8 subsequent users. Although the above discussion is directed to control module 274, it may
9 be appreciated by one skilled in the art the control processor 192 may perform the same
10 function with control processor's hardware and/or software modules and components.

11 Control signal generation module 282 may have a similar configuration to that of
12 control signal generator 200 (Fig. 8), so long as control signal generation module 282 is
13 capable of creating one or more control signals that may be synchronized with the audio
14 and video signals retrieved from memory 194, 196 or received through communication
15 trainer interface 276 from trainer module 256.

16 Trainer module 256 has substantially the same configuration as that of user module
17 252. Therefore, trainer module 256 includes an interface module 284 for transceiving data
18 between trainer module 256 and communication module 254. Communicating with
19 interface module 284 is an exercise module 286 and optionally a data storage module 288.
20 Furthermore, trainer module 256 includes a trainer interface 290 that enables a trainer to
21 input various exercise parameters to change the operating parameters of user module 252.
22 Trainer interface 290, therefore, may include the various input devices recited previously
23 with respect to user module 252 and/or treadmill 12.
24

1 Trainer module 256 optionally includes a control signal generation module 292.
2 Control signal generation module 292 enables trainer module 256 to generate control
3 signals that are synchronized with the audio and/or video signals that are transmitted from
4 trainer module 256 to user module 252. Control signal generation module 292, therefore,
5 is substantially the same as control signal generation module 282.

6 The synchronization of the audio and/or video signals with the control signals may
7 be achieved in a variety of different manners. For example, in one embodiment of such
8 synchronization, the audio and/or video signals indicate that the treadmill speed will move
9 from 1 mile per hour to 5 miles per hour. The control signal may not automatically move
10 the speed to 5 miles per hour, but may instead ramp gradually from 1 mile per hour to 5
11 miles per hour. Optionally, the control signal and video/audio signals are synchronized
12 such that a message increasing to a given speed is instantaneously matched by the exercise
13 device.

14 Following hereinafter is a discussion of the various optional modules that may be
15 incorporated within communication module 254, in addition to those discussed earlier. It
16 may be appreciated by one skilled in the art, that communication module 254 includes the
17 typical user interfaces and communication interfaces for enabling user module 252a-252n
18 to communicate with training module 256a-256n and optionally another user module 252a-
19 252n. Generally, therefore, communication module 254 includes various other functional
20 modules. Additionally, the following discussion describes various functions of
21 communication system 18 and its interaction with a user at treadmill 12, computer 14,
22 translator 13, third party 21, and/or a trainer at treadmill 20

1 As shown in Figure 12, communication module 254 (Figure 11) includes, in one
2 embodiment, an iFit.com website 300 that acts as both an interface with the user, while
3 also controlling the operation of user module 252a-252n and/or trainer module 256a-256n.
4 As such, iFit.com website 300 is in communication with a number of various other
5 modules forming one embodiment of communication module 254. Each module depicted
6 may represent functionality included within communication module 254, while
7 representing structural hardware and/or software modules that may either be incorporated
8 within the hardware and software modules of iFit.com website 300, or alternatively,
9 accessible by the hardware and software modules forming iFit.com website 300.

10 Generally, the iFit.com website 300 is hosted on one or more computers, whether a
11 general-purpose or special-purpose computer, that may have the form of computer 14, or
12 any variation thereof known by one skilled in the art in view of the teaching contained
13 herein. As such, the hardware and software modules forming iFit.com website 300 may
14 include those listed herein with reference to computer 14. As depicted in the illustrative
15 configuration of Figure 12, iFit.com website 300 may include login-registration module
16 302, audio program module 304, video program module 306, health information module
17 308, consumer purchase module 310, personal training module 312, competition module
18 314, diagnostic module 318, program generation module 318, advertising module 320, and
19 links module 322.

20 According to one aspect of the present invention, communication module 254
21 includes a login-registration module 302 that is accessible via iFit.com website 300.
22 Login-registration module 302 is configured to obtain the necessary registration and login
23
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1 information from a user wishing to use communication module 254 and the various
2 audio/video and literary information contained therein, with their exercise device.

3 Referring now to Figure 13, a flow diagram illustrating the operation of login-
4 registration module 302 is depicted. Initially, login-registration module 302 identifies
5 whether the user has logged into the communication module 254 before, as represented by
6 decision block 330. In the event that the user is accessing or "logging in" to iFit.com
7 website 300 for the first time, login-registration module 302 gathers the user information,
8 as shown by block 332. Specifically, login-registration module 302 may gather the user's
9 name, age, sex, type of exercise equipment being used, and various other data unique to the
10 user. Additionally, login-registration module 302 may present the user with multiple
11 questions to obtain statistical information regarding the user's background, education,
12 work experience, income, hobbies, and other related information to aid operators of
13 communication module 254 and system 250 in providing greater instructional information
14 to the user. Furthermore, such statistical information may also be used in targeting specific
15 advertisement to the individual during an exercise program.

16 As information is gathered from the user, payment information, such as credit card
17 numbers, accounts, and the like may further be obtained from the user. Alternatively, as
18 depicted in Figure 12, the step of obtaining payment information may follow the gathering
19 of the user information, as shown by block 334. Once all the necessary information is
20 gathered, login-registration module 302 assists the user in defining a login user
21 identification number (user ID) and password that are unique to the particular user, as
22 depicted by block 336. Upon defining the user password and user ID communication
23 module 254 stores the information within a memory of communication module 254 and
24

1 optionally user module 252. The user is subsequently asked to login to communication
2 module 254.

3 Following the logging in procedure, the user is given access, as depicted by block
4 340, to communication module 254 to the specific level that they are allowed, based upon
5 their responses to the various questions asked during the login procedure. For example, if
6 a user defines the exercise device as a treadmill located at home, the user may be limited to
7 only the treadmill related web pages of iFit.com website 300. Similarly, if a user does not
8 define any account information the user may be limited to only the free web pages and
9 information available thereon, while being restricted to access the fee-based web pages,
10 such as to purchase exercise profiles, exercise equipment, and the like.

11 Referring again to decision block 330, if a user accesses communication module
12 254 for a second or any other subsequent times, decision block 330 is in the negative, and
13 login-registration module 302 gathers the user ID and password from the user, as depicted
14 by block 342. Upon gathering the user ID and password, login-registration module 302
15 verifies the user ID and password with the stored user ID and password, as represented by
16 block 344. Subsequently, login-registration module 302 either rejects access to
17 communication module 254 or alternatively allows access thereto with the specific level of
18 access, as shown by blocks 346 and 340.

19 It may be appreciated by one skilled in the art, that various other functionality and
20 structures might form login module 302. For example, login-registration module 302 may
21 incorporate various processors, micro-controllers, logic circuits, and the like to analyze and
22 store the information input during a login process. In one configuration, login-registration
23 module 302 may communicate with user module 252 during the login process to verify
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Referring back to Figure 12 communication module 254 includes an audio program module 304. Generally, audio program module 304 is configured to provide the user with

1 multiple selections of audio programs that are available for particular types of exercise
2 device. Additionally, audio program module 304 allows the user to purchase copies of the
3 audio programs that may be performed on line.

4 As depicted in Figure 14, audio program module 304 allows the user to select from
5 various types of exercise devices with associated audio programs. As illustrated, audio
6 program may have separate information for treadmills, ellipticals, cycles, steppers, hikers,
7 climbers, Nordic type exercise devices, and various other types of exercise devices known
8 by one skilled in the art. As such, a user may manually select the particular exercise
9 device to be used. Alternatively, audio program module 304 may dynamically select the
10 particular exercise device and the various audio programs applicable to the user's exercise
11 device by analyzing the user information gathered by login-registration module 302. No
12 matter the manner by which the particular exercise device is selected, Figure 15 depicts an
13 illustrative flow diagram that depicts possible user selections and data flow related to
14 accessing the one or more audio programs available through communication system 18,
15 and more specifically iFit.com website 300.

16 As shown, upon selecting a particular exercise device (whether manually or
17 dynamically as discussed above), as depicted by block 350, the user is allowed to select the
18 type of music to be played during the program session, as depicted by block 352. Once the
19 user has selected the particular music type, the user is given the option to view the program
20 information to determine if the difficulty level is too great, as depicted by decision block
21 354. For example, if the individual wishes to view the exercise program profile,
22 communication module 254 packetizes an audio and/or graphical representation of the
23 exercise program selected (i.e., the maximum speed, maximum incline, time to perform the
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1 exercise program, amount of time at each maximum speed and incline, and various other
2 operating parameters known to one skilled in the art) and transmits the data to either the
3 integrally formed video output device 92 (Figures 1 and 6) mounted on treadmill 12, or
4 alternatively, to monitor 166 (Figure 7) associated with computer 14 for review by the
5 user, as depicted by block 356.

6 Alternatively, the user may decide not to view the user profile, such that the
7 response to decision block 354 is in the negative. Whether or not the user views the
8 exercise profile, the user may select to begin the online exercise program, as depicted by
9 decision block 358. If the user selects in the affirmative, communication module 254
10 delivers the audio signals, with control signals, to user module 252 in accordance with the
11 selection. Consequently, communication module 254 may download the entire audio
12 program to user module 252, or alternatively "stream" the audio signals thereto by a
13 manner known by one skilled in the art. Upon completion of the program, as depicted by
14 block 360, the user is given the opportunity to purchase their own copy of the audio
15 program just performed, as represented by decision block 364. In the event they decline to
16 purchase the program session, the particular audio program session is completed and the
17 user is optionally returned to the homepage of iFit.com website 300.

18 Referring again to decision block 358, if the user selects not to perform the online
19 program, the user may optionally select to purchase the program, as depicted by decision
20 block 364. If this selection is in the negative, the user is returned to the homepage of
21 iFit.com website 300. Otherwise, if the user wishes to purchase the program, audio
22 program module 302 gathers account information, as depicted by block 366 and media
23 format, such as CD, tape, MP3 file, or the like, as depicted by block 368. Furthermore,
24

1 audio program module 304, through video output device 90 or monitor 166 displays the
2 pricing guides for various types of media and/or associated mailing costs, as depicted by
3 block 370. Alternatively, audio program module 304 may interface with an accounting
4 module that performs the function of storing and collecting account information and
5 purchase information from any of the various modules associated with communication
6 module 254. As such, communication module 254 may have a centralized accounting
7 module that is accessible by one or more of the various modules forming communication
8 module 254. Furthermore, in another alternate configuration, audio program module 304
9 may communicate with login-registration module 304 and obtain account information
10 therefrom.

11 Referring again to Figure 12, communication module 254 further includes video
12 program module 306. Video program module 306 uses a similar flow of information and
13 related functional operations as audio program module 302; however, video program
14 module 306 merely gives video options to the user, whether such video options include or
15 exclude audio programs transposed or incorporated therein. Therefore, instead of selecting
16 a music type, video program module 306 enables a user to select a video program session
17 and receive real-time or streamed video and/or audio signals. Similarly, in the event the
18 user wishes to purchase the video program, video program module 306 enables the user to
19 select a particular type of video format such as CD ROM, DVD, video tape, MP3 file, and
20 the like.

21 According to another aspect of the present invention, communication module 254
22 includes a health information module 308. Health information module 308, in one
23 embodiment, includes a searchable database of information related to health issues for
24

1 those exercising and/or those who wish to begin to exercise using communication module
2 254. As such, in one configuration, health information module 308 is a distantly located
3 database, such as a relational, hierarchal, or some other database that is accessible by the
4 iFit.com website 300. Alternatively, health information module 308 may be incorporated
5 within the hardware and/or software components and modules hosting iFit.com website
6 300.

7 Communication module 254 may optionally include a consumer purchase module
8 310. Consumer purchase module 310 is configured to enable a user to purchase exercise
9 equipment, materials such as books and instructional materials, nutritional supplements,
10 and the like online. Consumer purchase module 310 may, therefore, link directly to one or
11 more affiliates of communication module 254. Alternatively, consumer purchase module
12 310 may include a database, whether relational, hierarchal, or the like that has stored
13 specifications, pricing guides, illustrative images of exercise devices and products, and the
14 like, that a user may search through to find the necessary or desired exercise equipment.
15 Additionally, consumer purchase module 310 may include the necessary hardware and/or
16 software modules to gather and store billing and purchase information from the user or
17 alternatively, consumer purchase module 310 may communicate with a centralized
18 accounting module that performs the necessary functions typically known by one skilled in
19 the art related to accounting, billing, purchasing, sales, and the like activities.

20 According to another aspect of the present invention, communication module 254
21 includes a personal training module 312. Personal training module 312 enables a user to
22 interact with a personal trainer on a live-on-live exercise session whether in a one on one
23 session or in a group setting. Additionally, personal trainer module 312 enables the user to
24

ask questions and receive communications from one or more personal trainers related to exercise advice, techniques, and programs, whether or not in real-time.

Referring now to Figure 16, a schematic representation of the various illustrative functional modules of personal training module 312 are illustrated. As shown, personal training module 312 includes a scheduling module 380 that enables various individuals to schedule times to talk to and optionally perform a live workout program. Scheduling module 380 enables the user to access a profile module 382 that contains one or more trainer profiles. In this way, personal training module 312 enables a user to review the profiles of the various trainer to select the particular trainer that best suits the users needs and/or time requirements. Profile module 382 may, therefore, include a database, whether relational, hierarchical, or the like, or some other data storage hardware and/or software that is capable of storing data in an accessible form.

Scheduling module 380, in one embodiment, communicates with a calendaring module 384 that lists the days of the month and the particular times available for one-on-one exercise programs with each trainer. Additionally, calendaring module 384 may list the times of group sessions and enable a user to select a particular session time reference within calendaring module 384 for the user to exercise with a personal trainer.

As shown, scheduling module 380 may communicate with a mailbox module 386 that includes multiple mailboxes, one for each user and trainer. Each mailbox may receive email from trainers and other users of communication module 254, or alternatively, only trainers or communication module 254 may deliver a message 388 to each user, such as electronic mail. Generally, each mailbox is configured to receive messages from the trainers regarding schedule one-on-one exercise sessions or group sessions. Additionally,

communication module 254 or iFit.com website 300 may deliver notifications of upcoming special group exercise session, or other information related to the user and/or exercising. Each user and/or trainer may save unique exercise programs created by the user and/or the trainer within data storage 390 accessible by mailbox module 386. Optionally, data storage 390 may correspond to memory 278 (Figure 11) or other external memory that is accessible to mailbox module 386.

Communicating with personal training module 312 is a video conferencing module 392. Video conferencing module 392 provides the functional hardware and/or software to allow a user to videoconference with a personal trainer. For example, video conferencing module 392 may include various hardware and/or software modules that: (1) assist with data transmission of audio and/or video signals between user module 252a-252n and trainer module 256a-256n; (2) assist with image and voice capturing; (3) packetizing or depacketizing data, and the like, such as those discussed with respect to system 10, or otherwise known to those skilled in the art in light of the teaching contained herein. Additionally, video conferencing module 392 allows the user to videoconference with the personal trainer in either a private room, as represented by numeral 394 or in a public room, as represented by numeral 396. In either case, (i.e., in the private or public room) the user may exercise with the personal trainer in a one-on-one or group setting.

It may be appreciated by one skilled in the art, that the functionality described herein with respect to personal training module 312 may be varied and is only illustrative of one possible embodiment thereof. Other functionality and associated structures such as hardware and/or software modules may be included within personal trainer module 312. Furthermore, various other linkages may occur between the various functional modules of

1 personal training module 312. For example, in one alternate embodiment, calendaring
2 module 384 is linked with private room 394 such that upon scheduling a one-on-one
3 exercise program, a private room is automatically scheduled for the user. Additionally,
4 calendaring module 384 may automatically send a message to the user's mailbox, thereby
5 providing the user with information regarding the particular private room scheduled and a
6 reminder of the schedule time.

7 According to another aspect of the present invention, as illustrated in Figure 12,
8 iFit.com website 300 includes a competition module 314. Competition module 314
9 enables one or more individuals to engage in competitive exercise programming with one
10 another or alternatively with the communication module 254 hosting iFit.com website 300.
11 Such competitive exercise programming motivates the users to exercise on a more regular
12 basis while also setting goals for the individual to reach. Competition module 314,
13 therefore, provides various benefits to those seeking to exercise on a regular basis.

14 Referring now to Figures 17A-17D, a flow diagram representing one illustrative
15 operation of competition module 314 is depicted. As shown, a user selects the particular
16 race types that they wish to engage in, as depicted by block 400. Three types of races are
17 depicted; race around the world 402, race against the computer 404, and personalized race
18 406; however various other race types are applicable and known to one skilled in the art, in
19 view of the teaching contained herein.

20 One particular race type is a race around the world. In the race around the world
21 type race, an individual races against various other individuals to determine who will run
22 around the world in the shortest time. Communication module 254 tracks the exercising
23 activities of competing users of user modules 252a-252b and computes the distance
24

1 traveled per exercise session and per user. A running total of the distance traveled is
2 maintained and updated. Each competitor may compare the total distance traveled against
3 other competitors to see who runs a number of miles equivalent to running around the
4 world in the shortest time.

5 With reference to Figure 17A, when the race around the world race type is selected,
6 competition module 314 retrieves the stored statistical information of the user, as depicted
7 by block 410. The statistical information may include, but is not limited to, distance
8 traveled by the user, average speed of the user, and the like. Once competition module 314
9 selects the stored statistical information, such information may be compared against other
10 competitors in the race, as depicted by block 412. Competition module 314 may deliver
11 comparison data to communication module 254. In turn, communication module 254 may
12 deliver a graphical representation of the user's exercise distant, times, speed, and other
13 information compared against other competitors to the user via user module 252a-252n. A
14 user module 252a-252n or a user operating treadmill 12, for example, may view their
15 distance and times with respect to other competing users of user modules 252a-252n,
16 thereby being motivated to exercise more. Once such information is depicted, the user
17 may modify their existing exercise programs to either increase or decrease exercise
18 parameters of the programs. For example, if the user sees that they have not run as many
19 miles as other competitors, they may increase the distance to be run in the future. Once the
20 user is ready, the user may begin or continue the race, as represented by block 414. As the
21 user exercises communication module 254 records new statistical information for the user,
22 such as speed, distance traveled, calories used, and the like.

23

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1 It may be appreciated by one skilled in the art that various other configurations of
2 the race around the world type race are applicable and known to one skilled in the art. For
3 example, in another configuration of the race around the world type race, a user may select
4 a particular time period, say from January 1 to February 1, and race against others to see
5 who travels the furthest distance within the given time period. Again, communication
6 module 254 tracks the distance traveled of each competitor and may provide graphical
7 representations of the position of one competitor against the other competitors. In still yet
8 another configuration, the race around the world may include racing over various types of
9 terrain ranging from deserts, mountains, and the like. As such, each competitor follows a
10 similar overall exercise profile and communication module 254 tracks the time that a user
11 takes to complete the race, for example, when a user slows down the treadmill based upon
12 the terrain traversed.

13 Referring again to Figure 17A, the user may optionally select to race against the
14 computer, as referenced by block 404. As the name of the race type suggests, this option
15 enables the user to select a particular type of race and a particular skill level of the
16 computer against which to race. As shown in Figure 17C, a user selects the difficulty level
17 for the particular race, as represented by block 416, such as in the case of a treadmill, the
18 speed, incline, distance, and the like. This may also enable the user to select a particular
19 skill level of the computer, such as a beginner runner, intermediate runner, or advanced
20 runner. Additionally, the user may select various other options, as represented by block
21 418, such as a head start for the computer or the user, scaling of the particular difficulty
22 level, and the like. Upon completing the selections, the user may race against the
23 computer, as represented by block 420.

24

1 With reference to Figure 17A, another type of race is a personalized race, as
2 depicted by block 406. In the personalized race, two or more individuals schedule a live
3 on live session, such as in a private room of personal training module 312 where they may
4 race one against the other, while viewing graphical representations of the distant, time, and
5 speed of the other competitors. Alternatively, two or more individuals may schedule a race
6 where the start time is adjusted based upon the particular location of the competitors.

7 As shown in Figure 17D, a user may select a time-adjusted race, as depicted by
8 decision block 422. If the user rejects time adjustment, then the user will race against one
9 or more competitors in a live-on-live competition. The user selects one or more
10 competitors, as referenced by block 424. Following the selection, each competitor enters a
11 private room to begin the race and to synchronize each competitor's exercise device with
12 communication module 254 and each other, as depicted by block 426. Alternatively, each
13 competitor may merely enter the private room that has been scheduled for the race, thereby
14 automatically selecting each competitor for the race, while synchronizing each
15 competitor's exercise device in block 426 in preparation for beginning the race as depicted
16 by block 428.

17 Synchronization prepares the communication links between each competitor and
18 generates the displays and data flow therebetween, such as but not limited to the audio and
19 video data flows and displays that enable each competitor to view their progress against
20 each other. For example, the display may include a racing track that shows a relative
21 position of each competitor one with another, or a trail that each competitor races along. It
22 may be appreciated that various other data flows and displays are appropriate and known to
23 one skilled in the art in view of the teaching contained herein.
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1 Time zone competitor. Similarly, upon the time for the west coast competitor to race,
2 communication module 254 will rebroadcast the particular race performed by the east coast
3 competitor and optionally the Mountain Time zone competitor to the west coast
4 competitor. It may be appreciated by one skilled in the art that the live on live and time-
5 adjusted races may be performed in a variety of different manners. For example, the
6 number of competitors is not limited to any specific number. Additionally, the time
7 adjustments may allow for competitors throughout the world to race one against another.

8 It may be appreciated by one skilled in the art that competition module 314 may
9 have various other configurations. For example, the functionality of competition module
10 314 may be incorporated within user modules 252a-252n. As such, two or more user
11 modules 252a-252n may be in direct communication one with another, without the aid of
12 communication module 254, and the internal modules of user modules 252a-252n enable
13 competition data to be transceived between the user modules 252a-252n.

14 With reference again to Figure 12, communication module 254 further includes a
15 diagnostic module 316. Diagnostic module 316 enables the user to perform a diagnostic
16 analysis of their particular exercise device or product in the case of disconnection or
17 changes in the operation of their exercise device or product. Additionally, diagnostic
18 module 316 enables the user to update and change operational parameters of the user's
19 exercise device or product, either through manual activation of diagnostic control 88
20 (Figure 6) or automatically through communication module 254. For example, in the event
21 a new software update is available for the particular exercise device's software,
22 communication module 254 may automatically recognize operation of the update and
23 deliver the same to each individual having an exercise device or product that may benefit
24

1 from updating of the software. Additionally, the diagnostic module 316 may identify
2 problems with the exercise device and subsequently schedule arrival times for maintenance
3 workers to resolve physical problems that are unable to be fixed by remote communication
4 from communication module 254.

5 As such, referring now to Figure 18, an illustrative flow diagram representing
6 diagnostic module 316 is depicted. As shown, a user is asked to select whether they wish
7 to update their product, as depicted by decision block 440. Alternatively, communication
8 module 254 may automatically recognize that the exercise device or product is to be
9 updated, therefore eliminating block 440 from the flow diagram. In the event that the user
10 wishes to update the exercise device or product, communication module 254, and more
11 specifically diagnostic module 316, connects directly to user module 252a-252n via
12 network 16 (Figures 1 and 10), as depicted by block 442. Such connection may be
13 achieved by a variety of manners, as known by one skilled in the art and also discussed
14 herein. Upon connecting to user module 252a-252n or product, diagnostic module 316
15 verifies that particular hardware and/or software modules are contained therein, as shown
16 by block 444. In the event that software or read/write hardware may be updated, the
17 necessary executable file is either streamed or downloaded to user module 252a-252n, as
18 referenced by block 446. Upon receiving the downloadable file, user module 252a-252n
19 executes the executable file to update the hardware and/or software components therein, as
20 referenced by block 448. Alternatively, such as in system 10 (Figure 1), the downloadable
21 file may be downloaded to computer 14 which may execute the program and update
22 treadmill 12 remotely.

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1 Referring again to decision block 440, when the user answers in the negative, the
2 user is subsequently queried as to whether they are having difficulty with their exercise
3 device or product, as identified decision block 450. Upon answering in the affirmative,
4 diagnostic module 316 queries the user, as depicted by block 452, as to the difficulties they
5 are having and what attempts if any, they have made to resolve the problem. Upon
6 gathering the necessary information, diagnostic module 316 connects to the exercise device
7 or other device, as depicted by block 454, and thereafter analyzes the various hardware and
8 software problems to resolve and identify whether it is possible to remotely fix the
9 problem, as depicted by blocks 456 and 458. In the event that the exercise device or
10 device may be remotely corrected, through an update, as depicted by decision block 460,
11 diagnostic module 316 will then perform the steps of updating as previously described in
12 block 442, 444, 446, and 448. Alternatively, if the problem may not be corrected through
13 remote access, diagnostic module 316 may automatically schedule a time for physical
14 maintenance of the device or product. It may be appreciated by one skilled in the art, that
15 various other functionality may be performed by diagnostic module 316.

16 In an alternate configuration, when user module 252 (Figure 10) is placed in the
17 active status (e.g. turned on) user module 252 may optionally analyze its internal hardware
18 and/or software modules to verify that such modules are operating correctly. In the event
19 that one or more problems occur, diagnostic module 316 answers decision block 440 in the
20 affirmative, thereby automatically obtaining an update from communication module 254
21 (Figure 10) or alternatively manually requesting information from the user. Optionally,
22 when a user of user module 252 accesses communication module 254 (Figure 10),
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1 communication module 254 activates diagnostic module 316 (Figure 12) to analyze user
2 module 252.

3 Referring again to Figure 12, according to another aspect of the present invention,
4 communication module 254 enables a user to prepare a personalized audio and/or video
5 exercise program. Communication module 254, therefore, includes program creation
6 module 318. Program creation module 318, referring now to Figure 19, enables a user to
7 select an audio program session, as depicted by decision block 470 and/or a video program
8 session, as depicted by decision block 478. In the event that only an audio program
9 session is desired, the user initially selects the type of exercise device that the program is to
10 be used, such as but not limited to treadmills, cycles, steppers, hikers, climbers, Nordic
11 style devices, ellipticals, and the like, as represented by block 472. Upon selecting the type
12 of device, the user may then select a specific type of music, such as rock, pop, country,
13 jazz, classical, alternative, or the like, that is to be used with the exercise program, as
14 represented by block 474. Once a particular music type is selected, the user may then
15 generate an exercise profile that the exercise device will follow during the exercise
16 program, as depicted by block 476. Generation of the exercise profile may include
17 defining one or more operating parameters of the exercise device, such as the speed and
18 inclination of the tread base for a given period of time. Upon finalizing the exercise
19 program, the user may then store the program, as represented by block 488, such as in their
20 mailbox, on their exercise device, on a computer readable media, or the like.

21 In the case of a video program, the user again selects the particular type of exercise
22 device to be used in association with the exercise programming, as represented by block
23 480. Upon selecting the exercise device, the user may select a particular video
24

The presently described invention may be used in a variety of situations to enable individuals who wish to exercise to obtain more beneficial results in a highly motivated setting. With this in mind, following hereinafter is an illustrative embodiment of an environment within which the exercise devices and modules of the presently described invention may be used.

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Alternatively, master device 502 may be a treadmill with one or more processors, controllers and memory storage devices that allow master device 502 to control one or more slave devices 504a-504n without entirely incorporating a computer therein. Master device 502, therefore, may or may not incorporate the structure and functionality of

1 treadmill 20 (Figure 1) or other exercise device, communication module 254 (Figure 10),
2 and/or trainer modules 256a-256n (Figure 10).

3 Generally, master device 502 enables an individual exercising thereupon to control
4 one or more slave devices 504a-504n, in real-time, whether or not master device 502
5 receives input data from the one or more slave devices 504a-504n. As depicted, master
6 device 502 is directly linked with each of the slave devices 504a-504n via a
7 communication line connection, such as but not limited to existing broadcast technology,
8 including short range wireless transmissions, television broadcast over the airwaves, cable
9 or cable modems, satellite, telephone lines, whether analog or digitally based, wireless
10 technology, other high-speed data connections, or any other suitable transmission
11 technology or medium. Master device 502, therefore, includes the appropriate hardware
12 and/or software applicable to enable master device 502 to communicate and control one or
13 more slave devices 504a-504n.

14 In one case, the internal components of master device 502, alone, are sufficient to
15 enable communication to and control of slave devices 504a-504n. Therefore, master
16 device 502 need not incorporate computer 14 (Figure 1), translator device 13 (Figure 1), or
17 hardware and/or software modules of communication system 18, or communication
18 module 254 therein. In another configuration, master device 502 may communicate with
19 slaves 504a-504n via a network and a communication system or module so that master-
20 slave system 500 has a similar configuration to system 250 where one or more trainer
21 modules 256a-256n control the operation of one or more user modules 252a-252n via
22 network 16, whether or not communication module 254 is used to facilitate such
23 communication and control.

Each slave device 504a-504n and sub-slave device 506a-506n linked to master device 502 may take the form of an exercise device, such as treadmill 12, translator device 13, and/or computer 14 of Figure 1. Additionally, each slave device 504a-504n may incorporate the structure and functionality of user modules 252a-252n. Each slave device 504a-504n, therefore, may be controlled by master device 502 in real-time while enabling the user to manually override the operation of the exercise device in opposition to control signals received from master device 502.

As illustrated in Figure 20, each slave 504a-504n may optionally be a master to subsequent sub-slave device 506a-506n, as shown in broken lines. In such a manner, various exercise devices may be separated into different groups. For example, slave 504a may receive a beginner level control signal from master 502. In turn, slave 504a may control the operation of one or more sub-slave devices 506a-506n that are operated by one or more beginners. Similarly, slave 504b may receive an intermediate level control signal from master 502 and subsequently control one or more sub-slaves (not shown), while slave 504n may receive an advanced level control signal from master 502 and subsequently control one or more sub-slaves (not shown).

According to another alternate configuration, master device 502 may receive information from each slave device 504a-504n representative of the user's heart rate, blood pressure, and the like. Master device 502 may, therefore, modify each slave device 504a-504n or sub-slave device 506a-506n, whether individually or collectively, based upon the data received from the user. For example, if the user's heart rate is too high, master device 502 may automatically reduce one or more operating parameters of the exercise device, such as speed, incline, resistance, and the like.

1 Although it is preferred that the communications performed according to the
2 present invention (e.g., the first signal and the second signal) be in real time, it is also
3 possible to achieve many objects of the present invention by engaging in communication
4 other than real time.

5 According to one aspect of the present invention, an exercise device is disclosed
6 that incorporates various audio/video features into the device or exercise device itself
7 rather than having external audio/video features connected thereto. The exercise device
8 may also include sensors that track the activity level of an individual on the exercise
9 device, to determine whether an user is actually exercising or to determine whether the
10 user is old enough to be using the exercise device.

11 According to another aspect of the present invention, one or more users are enabled
12 to exercise in a group setting, while being distantly located one from another. Furthermore,
13 the present invention enables home exercise equipment users to interact with trainers, other
14 users, physical therapists, physicians, and the like in live-on-live workout sessions and, in
15 some situations, allow a trainer, physical therapists, physicians, and the like to control at
16 least one operating parameter of the exercise device upon which the user is training.

17 To enable the above-described communication, a user may access a communication
18 system or module that facilitates communication between one or more users, trainers, or
19 third parties. Such communication system or module may include at least one web site
20 with associated web pages. As a user accesses the communication system or module,
21 statistical information related to an individual's workout regime, such as how much time
22 an individual spends on each various exercise device, the locations where they trained,
23 when each user accesses the communication system or modules, and the like is gathered.
24

1 Generally, the communication system or module, and hence the web site, may
2 enable a user to access information and programming contained therein, while, in one
3 embodiment, the communication system or module has the ability to control at least one
4 operating parameter of the device or exercise device via the web site and web pages. In
5 one case, when a user activates one or more input devices, such as a touch sensitive screen
6 having a visual representation of the web page thereon, the communication system or
7 module, via the web site, changes the operational parameters of the device or exercise
8 device.

9 Various programming is accessible through communication system or module. For
10 example, the user may select live or recorded programming. One type of programming or
11 capability of the communication system or module relates to competitive motivational
12 content. Such functionality allows an individual to compare the amount of miles traveled
13 on an exercise device against individuals throughout the world engaging in similar
14 activities. Therefore, competitors around the world may race against one another.
15 Optionally, two or more users may link their exercise devices directly without the need to
16 communicate through the communication system or module.

17 Another type of motivational content may include one or more electronic
18 magazines or books that a user may download to view while exercising. Yet another type
19 of motivational content or programming relates to the ability of the user to view an
20 exercise profile representative of the exercise program currently being performed by the
21 user. Such profile may be displayed to the user continuously, periodically, or other under
22 the control of the user and/or the communication system or module. In one configuration,
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1 the exercise profile may appear and overlay the visual image that the user is watching,
2 whether the visual image is a television broadcast, webcast, or the like.

3 Another type of motivational content relates to various advertisements. During the
4 exercise program a user may receive commercial advertising through an advertising banner
5 that may continuously or periodically appear on the video display. Optionally, the
6 advertisement may appear in a picture-in-picture advertisement that is delivered to the user
7 as a micro-commercial that is displayed to the user and subsequently removed.

8 The programming received from the communication system or module may be live
9 or recorded. In some situations the live programming received by the user may be too
10 difficult or not difficult enough for the user of the exercise device. The present invention
11 provides scaling controls that allow the user to scale the signals received from the
12 communication system or module and/or the trainer. In this manner, the exercising user
13 may increase or decrease the intensity of the exercise program. Such scaling may be
14 achieve either at the user device, trainer device, the communication system or module, or
15 at some other third party modules that may control the operation of the user's exercise
16 device. By selecting a particular option on the web page, the user's appliance will be
17 controlled according to the scaled choice. Optionally, the user may define a maximum
18 limited for one or more of the operating parameters of the device, such that transmitted
19 programming is limited in accordance with the maximum values defined for each operating
20 parameter.

21 According to another aspect of the present invention, the systems, devices, and
22 modules of the present invention enable bi-directional communication between one or
23 more user devices and one or more trainer devices. The communication system or module
24

According to another aspect of the present invention, the exercise device or device includes a diagnostic button. Upon activation of the diagnostic button, the internal hardware and/or software components of the device or exercise device, solely, or in

1 combination with the communication system or modules tests and checks the various
2 hardware and/or software modules, components, or elements of the device or exercise
3 device. If any problems are found the internal hardware and/or software components of
4 the device or exercise device, solely, or in combination with the communication system or
5 modules attempt to fix the problems. Additionally, the diagnostic button may activate a
6 downloading sequence to update information on the appliance with new software from a
7 central database, such as at communication system or module.

8 According to another aspect of the present invention, the present invention may
9 includes one or more interfaces that may communicate with existing hardware and/or
10 software components of various existing devices and exercise devices. As such, those
11 devices or exercise devices not currently capable of communicating with communication
12 system or module, may be retrofitted with various hardware and/or software modules as
13 described herein to allow the exercise device or device to communicate with the
14 communication system or module.

15 As mentioned, the presently described systems, methods, and devices may be used
16 in a master-slave system. In such a system, changes to the operating parameters of the
17 master are translated to the operating parameters of the slave, thereby controlling the
18 operation of the device or exercise device. For example, in a spinner class, upon activation
19 of a more intense riding experience by the master, the slave spinners also give their riders a
20 similarly intense riding experience. The master may selectively choose groups of
21 participants based on various criteria, such as participant's heart rates, and change those
22 participants exercise program, while maintaining other participants at the original or
23 different exercise level.

1 Embodiments of the present invention are also disclosed in copending United
2 States Patent Applications entitled (i) Computer Systems and Methods for Interaction with
3 Exercise Device, to Scott R. Watterson, William T. Dalebout and Darren C. Ashby, filed
4 August 18, 2000, which is incorporated herein in its entirety by reference; and (ii) Systems
5 and Methods for Interaction with Exercise Device, to Scott R. Watterson, William T.
6 Dalebout and Darren C. Ashby, filed August 18, 2000, which is incorporated herein in its
7 entirety by reference.

8 As used in this specification and the appended claims, the phrases “communicating
9 with,” and “in communication with” and similar phrases shall mean any type of applicable
10 communication known to one skilled in the art in light of the disclosure herein, such as
11 electrical communication, optical communication, physical communication, magnetic
12 communication, software communication, hardware communication, data communication,
13 and the like.

14 The present invention may be embodied in other specific forms without departing
15 from its spirit or essential characteristics. The described embodiments are to be considered
16 in all respects only as illustrative and not restrictive. The scope of the invention is,
17 therefore, indicated by the appended claims rather than by the foregoing description. All
18 changes which come within the meaning and range of equivalency of the claims are to be
19 embraced within their scope.

20 What is claimed and desired to be secured by United States Letters Patent is:
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1 1. An exercise device configured to enable the interaction of a user, the
2 exercise device comprising:

3 (a) an exercise mechanism comprising a movable element for movement in
4 performance of exercise by a user, the exercise mechanism having one or more
5 operating parameters;

6 (b) interface means, communicating with the exercise mechanism, for
7 gathering a first signal from the user;

8 (c) communicating means, communicating with the interface means, for
9 receiving a packetized second signal; and

10 (d) means, responsive to the packetized second signal, for controlling the
11 operating parameters of the exercise mechanism.

12
13 2. An exercise device as recited in claim 1, wherein the exercise device is
14 configured to enable a user to interact in real-time communication, the first signal
15 comprising a real time signal and the second signal comprising a real time signal and the
16 means for controlling the operating parameters of the exercise mechanism controlling the
17 operating parameters in real time.

18
19 3. An exercise device as recited in claim 1, wherein the packetized second
20 signal comprises a signal selected from the group consisting of an audio signal, a
21 visual signal, and a control signal.

1 4. An exercise device as recited in claim 3, wherein the control signal is
2 synchronized with at least one of the audio signal and the visual signal.

3
4 5. An exercise device as recited in claim 3, wherein a trainer promulgates the
5 control signal.

6
7 6. An exercise device as recited in claim 3, wherein a communication system
8 promulgates the control signal.

9
10 7. An exercise device as recited in claim 3, wherein a third party promulgates
11 the control signal.

12
13 8. An exercise device as recited in claim 1, wherein the interface means is
14 selected from the group consisting of: (i) one or more audio input devices; and (ii)
15 one or more video output devices.

16
17 9. An exercise device as recited in claim 1, wherein the interface means
18 comprises one or more controllers.

19
20 10. An exercise device as recited in claim 1, wherein the interface means
21 comprises a video camera integrally formed with the exercise device.

1 11. An exercise device as recited in claim 1, wherein the communicating means
2 enables transmission of the first signal.

3
4 12. An exercise device as recited in claim 1, wherein the communicating means
5 comprises one or more processors adapted to packetize the first signal gathered by
6 the interface means.

7
8 13. An exercise device as recited in claim 1, wherein the communicating means
9 is selected from the group consisting of (i) a translator device; and (ii) a computer.

10
11 14. An exercise device as recited in claim 1, wherein the communicating means
12 receives the packetized second signal including synchronized control signals from a
13 communication system that is in communication with a trainer.

14
15 15. An exercise device as recited in claim 1, wherein the communicating means
16 communicates with a communication system that is configured to generate one or
17 more second signals.

18
19 16. An exercise device as recited in claim 15, wherein the communication
20 system comprises memory configured to store the second signal.

17. An exercise device as recited in claim 1 wherein the first signal comprises one or more signals representative of any measurable parameter of the exercise device.

18. An exercise device as recited in claim 1, wherein the first signal comprises one or more signals representative of any measurable parameter of the user of the exercise device.

19. An exercise device as recited in claim 1, wherein the first signal represents the status of the exercise device thereby activating the communication means to receive the packetized second signal.

20. An exercise device as recited in claim 19, wherein the status of the exercise device is selected from the group consisting of: (i) an active signal; (ii) inactive signal; and (iii) standby signal.

21. An exercise device as recited in claim 1, further comprising means for reproducing the second signal.

22. An exercise device as recited in claim 21, wherein the means for reproducing the second signal comprises one or more audio output devices and one or more video output devices.

1 23. An exercise device as recited in claim 21, wherein the means for
2 reproducing the second signal comprises an output device selected from the group
3 consisting of an audio output device and a video output device.
4

5 24. An exercise device as recited in claim 1, wherein the means for controlling
6 the operating parameters of the exercise mechanism in comprises one or more
7 controllers configured to separate the synchronized control signal from the second
8 signal.
9

10 25. An exercise device as recited in claim 24, wherein the means for controlling
11 further comprises one or more actuators activated by the one or more controllers in
12 response to the synchronized control signal.
13

14 26. An exercise device as recited in claim 1, wherein the packetized second
15 signal comprises a signal selected from the group consisting of: (i) a packetized
16 control signal; and (ii) a packetized control signal and a signal from a
17 communication system.
18

19 27. An exercise device as recited in claim 1, wherein the packetized second
20 signal comprises a packetized control signal and a signal from a trainer, the signal
21 from the trainer comprising a signal selected from the group consisting of an audio
22 signal and a visual signal.
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28. An exercise device as recited in claim 27, wherein receipt of said packetized second signal is substantially uninterrupted during receipt of said control signal.

1 29. An exercise device configured to enable interaction of a user, the exercise
2 device comprising:

3 (a) an exercise mechanism comprising a movable element for
4 movement in performance of exercise by a user, the exercise mechanism having
5 one or more operating parameters;

6 (b) at least one user interface device, communicating with the exercise
7 mechanism, the at least one interface device gathering a first signal from the user;

8 (c) a communicating mechanism, communicating with the user
9 interface device, the communicating mechanism receiving a packetized second
10 signal; and

11 (d) a controller, responsive to the packetized second signal, configured
12 to control the operating parameters of the exercise mechanism.
13

14 30. An exercise device as recited in claim 29, wherein the at least one user
15 interface device is selected from the group consisting of one or more audio input
16 devices and one or more video input devices.
17

18 31. An exercise device as recited in claim 29, wherein the communicating
19 mechanism comprises an iFit.com button, the iFit.com button adapted to initiate
20 communication with a communication system that enables real-time transmission
21 of the first signal to a trainer.
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1 32. An exercise device as recited in claim 31, wherein the communicating
2 mechanism enables transmission of the first signal, evaluates the first signal and
3 generates the second signal based upon the first signal.
4

5 33. An exercise device as recited in claim 32, wherein the first signal
6 comprises signals that represent one or more parameters of the user exercising on
7 the exercise device.
8

9 34. An exercise device as recited in claim 33, wherein the one or more
10 parameters comprise any measurable parameter of the user of the exercise device.
11

12 35. An exercise device as recited in claim 29, wherein the communicating
13 mechanism comprises a translator device and computer communicating with the
14 exercise mechanism.
15

16 36. An exercise device as recited in claim 29, further comprising a control
17 panel, the control panel being configured to enable a user to input the first signal
18 and to receive the second signal.
19

20 37. An exercise device as recited in claim 29, wherein said at least one interface
21 device comprises a manual override control, the manual override control being
22 configured to prevent the means, responsive to the packetized second control
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1 signal, for controlling the operating parameters of the exercise mechanism in real-
2 time from controlling the operating parameters of the exercise mechanism.

3
4 38. An exercise device as recited in claim 29, wherein the exercise device
5 further comprises a safety mechanism, said safety mechanism capable of
6 manipulating the operating parameters of the exercise mechanism in the event that
7 the packetized second control signal is interrupted.

8
9 39. An exercise device a recited in claim 29, wherein the first signal comprises
10 a real time signal, the communicating mechanism receives a packetized second real
11 time signal and the controller is configured to control the operating parameters of
12 the exercise mechanism in real time.

13
14 40. An exercise device as recited in claim 29, wherein the exercise device
15 further comprises one or more sensors, said one or more sensors being configured
16 to sense the one or more operating parameters of the exercise mechanism.

17
18 41. An exercise device as recited in claim 29, wherein the exercise device
19 further comprise one or more sensors, said one or more sensors being configured to
20 identify whether a user is using the movable element.

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22 42. An exercise device as recited in claim 41, wherein the one or more sensors
23 identify whether the user is an adult or juvenile user.
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43. An exercise device as recited in claim 29, wherein the exercise device is a device selected from the group consisting of a master device, a slave device, and a sub-slave device.

44. An exercise device a recited in claim 43, wherein the exercise device is a slave device and is configured to control one or more sub-slave devices.

45. An exercise device as recited in claim 29, wherein the exercise device further comprise a diagnostic control, said diagnostic control activating a connection with a communication system to check the status of the exercise device.

46. An exercise device as recited in claim 45, wherein the diagnostic control activates a downloading process to retrieve one or more software updates the from communication system.

47. An exercise device as recited in claim 29, wherein the exercise device further comprises a scaling control, the scaling control being configured to enable a user to select a value representative of the proportional change to be made to the packetized control signal received by the communicating means.

48. An exercise device as recited in claim 29, wherein the communicating mechanism enables transmission of the first signal.

1 49. An exercise device configured to enable a user to receive workout-related
2 information, comprising:

3 (a) an exercise mechanism comprising a movable element for
4 movement in performance of exercise by a user;

5 (b) a user interface device communicating with the exercise mechanism
6 and configured to gather one or more user control signals from the user;

7 (c) a communicating mechanism in communication with the user
8 interface device and adapted to enable transmission of the user control signals to a
9 communication system, the communicating mechanism being further adapted to
10 receive a packetized second signal including synchronized control signals from the
11 communication system;

12 (d) means for reproducing the second signal; and

13 (e) means, responsive to the synchronized control signals carried by the
14 second signal, for controlling the operating parameters of the exercise mechanism.

15
16 50. An exercise device as recited in claim 49, wherein the user interface device
17 comprises one or more manually activated controls configured to generate the user
18 control signals.

19
20 51. An exercise device as recited in claim 49, wherein the user interface device
21 comprises a translator device and a computer.

- 1 52. An exercise device as recited in claim 49 wherein the second signal
2 comprises one or more audio and video signals and the synchronized control signal.
3
- 4 53. An exercise device as recited in claim 49, wherein the communication
5 system comprises:
6 (a) one or more storage devices adapted to store the one or more audio
7 and video signals;
8 (b) a control signal generator configured to generate one or more
9 synchronized control signals; and
10 (c) a control processor configured to synchronize the synchronized
11 controls signals with the one or more audio and video signals and deliver the
12 second control signal to the communication mechanism.
13
- 14 54. An exercise device as recited in claim 49, wherein the communication
15 system receives the one or more audio and video signals and the synchronized
16 control signals from an exercise device of a trainer.
17
- 18 55. An exercise device as recited in claim 49, wherein the communication
19 system receives the synchronized control signals from a third party communicating
20 with the communication system.
21
- 22 56. An exercise device as recited in claim 49, wherein the exercise device
23 communicates with the communication system via a network.
24

1
2 57. An exercise device as recited in claim 56, wherein the network comprises a
3 network selected from the group consisting of a wide area network, a local area
4 network, a home network, a packetized network, and the Internet.
5

6 58. An exercise device as recited in claim 49, wherein the communication
7 system comprises a web site comprising one or more web pages, the web site being
8 configured to assist with the transmission of the packetized second signal.
9

10 59. An exercise device as recited in claim 49, wherein the means for
11 reproducing the second signal comprises one or more audio output devices and one
12 or more video output devices.
13

14 60. An exercise device as recited in claim 59, wherein the one or more video
15 output devices comprises one or more video displays.
16

17 61. An exercise device as recited in claim 49, wherein the communication
18 system analyses the user control signals and generates the packetized second
19 signals based upon the analysis of the user control signals.
20
21
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24

1 62. An exercise device as recited in claim 61, wherein the communication
2 system receives another signal from the exercise device representative of the one or
3 more operating parameters of the exercise mechanism and generates the packetized
4 second signal based upon the another signal.

5
6 63. An exercise device as recited in claim 61, wherein the communication
7 system receives another signal from the exercise device, the another signal being
8 representative of any measurable parameter of the user of the exercise device.
9

10 64. An exercise device as recited in claim 49, wherein the means, responsive to
11 the synchronized control signals carried by the second signal, for controlling the
12 operating parameters of the exercise mechanism comprises:

- 13 (a) a speed actuator configured to vary a speed of the movable element;
14 (b) an incline actuator configured to vary the incline of the movable
15 element;
16 (c) one or more decoders configured to separate the synchronized
17 control signals from the second signal;
18 (d) one or more processors configured to operate the speed actuator and
19 the incline actuator in response the synchronized control signal received
20 from the one or more decoders.
21
22
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1 65. An exercise device as recited in claim 49, wherein the means, responsive to the
2 synchronized control signals carried by the second signal, for controlling the
3 operating parameters of the exercise mechanism comprises:

- 4 (a) a speed actuator configured to vary a speed of the movable element;
5 (b) a resistance actuator configured to vary the resistance applied to the
6 movable element;
7 (c) one or more decoders configured to separate the synchronized
8 control signals from the second signal;
9 (d) one or more processors configured to operate the speed actuator and
10 the resistance actuator in response the synchronized control signal received
11 from the one or more decoders.
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66. An exercise device configured to enable a user thereof to interact with a

(a) an exercise mechanism comprising a movable element for

(b) a user interface device configured to gather a first real-time signal

- (c) a communication interface cooperating with the user interface

(d) means for reproducing the second real-time signal; and

(e) means, responsive to the one or more control signals, for controlling the

67. An exercise device as recited in claim 66, wherein the second real-time

68. An exercise device as recited in claim 66, wherein the second real-time

1 from the group consisting of the air waves, cable, satellite, the internet, radio
2 frequency, wireless, or infra-red.
3

4 69. An exercise device as recited in claim 66, wherein the means for
5 reproducing the another audio and video signal is integrated into the exercise
6 device.
7

8 70. An exercise device as recited in claim 66, wherein the means for
9 reproducing the another audio and video signal is separate and distinct from the
10 exercise device.
11

12 71. An exercise device as recited in claim 69 or 70, wherein the means for
13 reproducing the another audio and video signal comprises a television.
14

15 72. An exercise device as recited in claim 69 or 70, wherein the means for
16 reproducing the another audio and video signal comprises an audio output device
17 and a video output device.
18

19 73. An exercise device as recited in claim 66, wherein the means for controlling
20 comprises:
21

22 (a) means for decoding the control signals; and

23 (b) means, electrically coupled to the decoding means, for driving the
24 movable element in response to the decoded control signal.

1 74. An exercise device as recited in claim 66, wherein the means for controlling
2 comprises:

3 (a) means for decoding the control signals having an input and an
4 output; and

5 (b) means, electrically coupled to the output of the decoding means, for
6 driving the moveable element in response to the decoded control signal.

7
8 75. An exercise device as recited in claim 66, wherein the reproducing means
9 comprises a loudspeaker.

10
11 76. An exercise device as recited in claim 66, wherein the reproducing means
12 comprises an RF transmitter configured to transmit the second signal to an output
13 device.

14
15 77. An exercise device as recited in claim 66, wherein the reproducing means
16 comprises an infrared transmitter configured to transmit the second signal to an output
17 device.

1 78. An exercise device for enabling one or more users to select and perform an
2 exercise program stored on a communication system, the exercise device comprising:

3 (a) an exercise mechanism comprising a movable element for movement in
4 performance of exercise by a user, the exercise mechanism being configured to
5 enable a user to exercise in response to an exercise program selected from one or
6 more exercise programs stored on a communication system in network
7 communication with the exercise mechanism; and

8 (b) control means, communicating with the exercise mechanism, for
9 receiving one or more packetized control signals from the communication system
10 indicative of the selected exercise program and for changing one or more operating
11 parameters of the exercise mechanism based upon the selected exercise program
12 and the one or more packetized control signals.

13
14 79. An exercise device as recited in claim 78, wherein the selected exercise
15 signals comprise at least one audio signal and at least one video signal.

16
17 80. An exercise device as recited in claim 78, wherein the communication
18 system comprises one or more storage devices adapted to store the one or more
19 exercise programs.

20
21 81. An exercise device as recited in claim 78, wherein the network is selected
22 from the group consisting of a local area network, a wide area network, and the
23 Internet.

24

1 82. An exercise device as recited in claim 78, wherein the exercise mechanism
2 includes one or more actuators configured to vary one or more operating
3 parameters of the exercise mechanism.
4

5 83. An exercise device as recited in claim 78, wherein the control means
6 comprises at least one decoder configured to decode the one or more packetized
7 control signal and at least one processor configured to activate the one or more
8 actuators in response so the one or more decoded control signals.
9

10 84. An exercise device as recited in claim 78, wherein the communication
11 system comprises:

12 (a) one or more storage devices adapted to store the one or more audio and
13 video signals;

14 (b) a control signal generator configured to generate one or more control
15 signals; and

16 (c) a control processor configured to synchronize and packetize the controls
17 signals with the one or more audio and video signals and deliver the packetized
18 control signal to the exercise mechanism.
19
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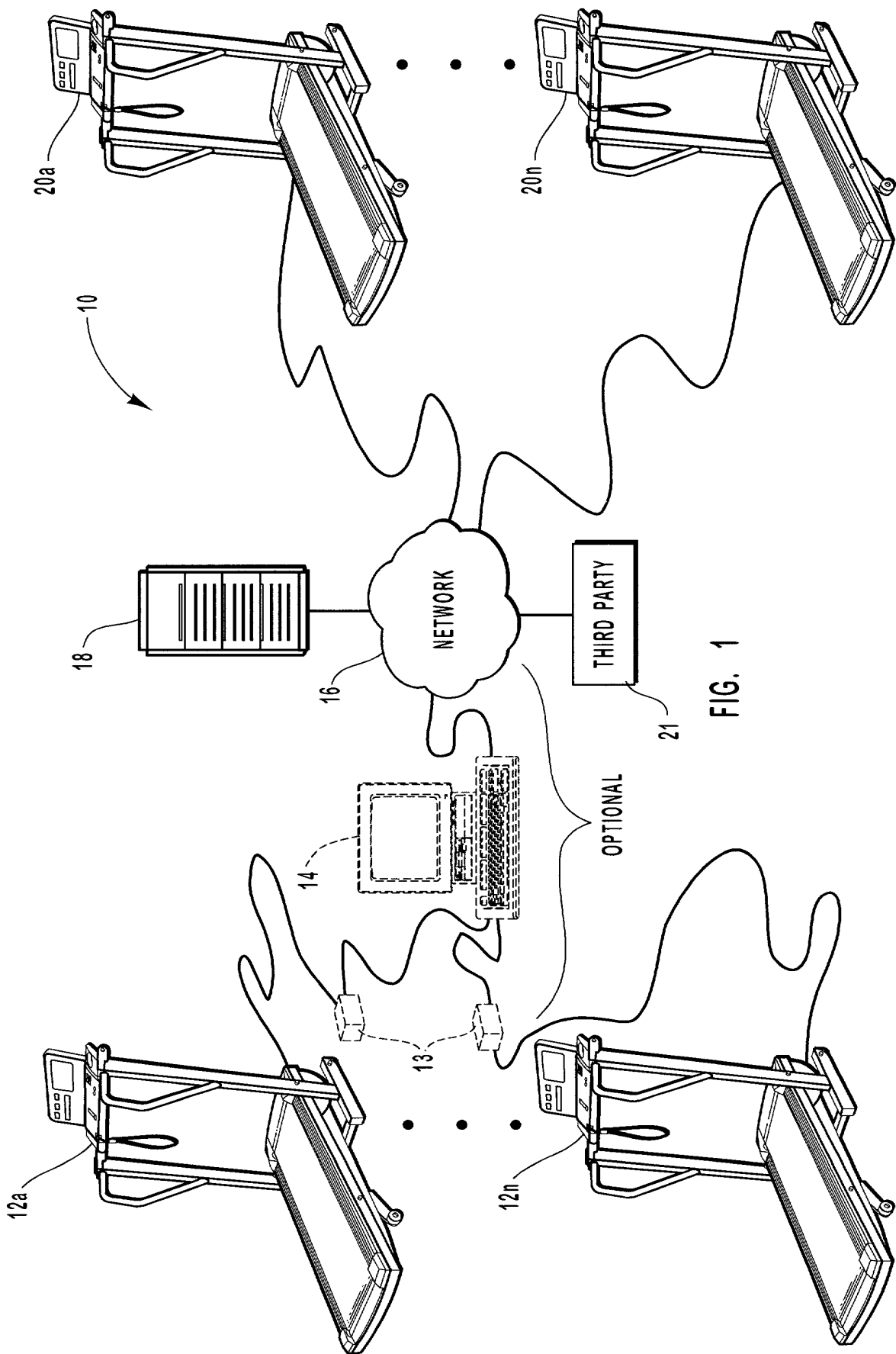


FIG. 1

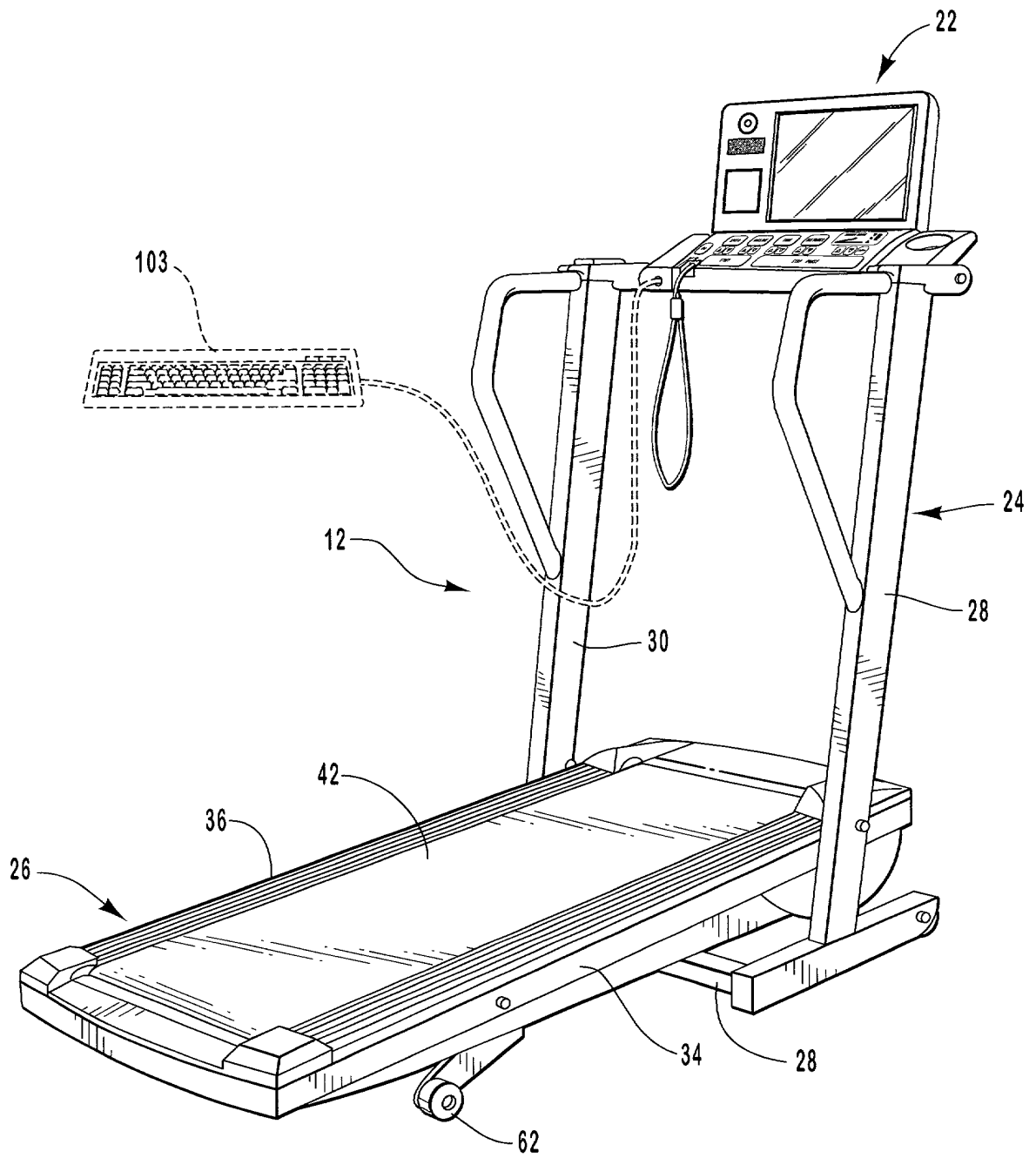


FIG. 2

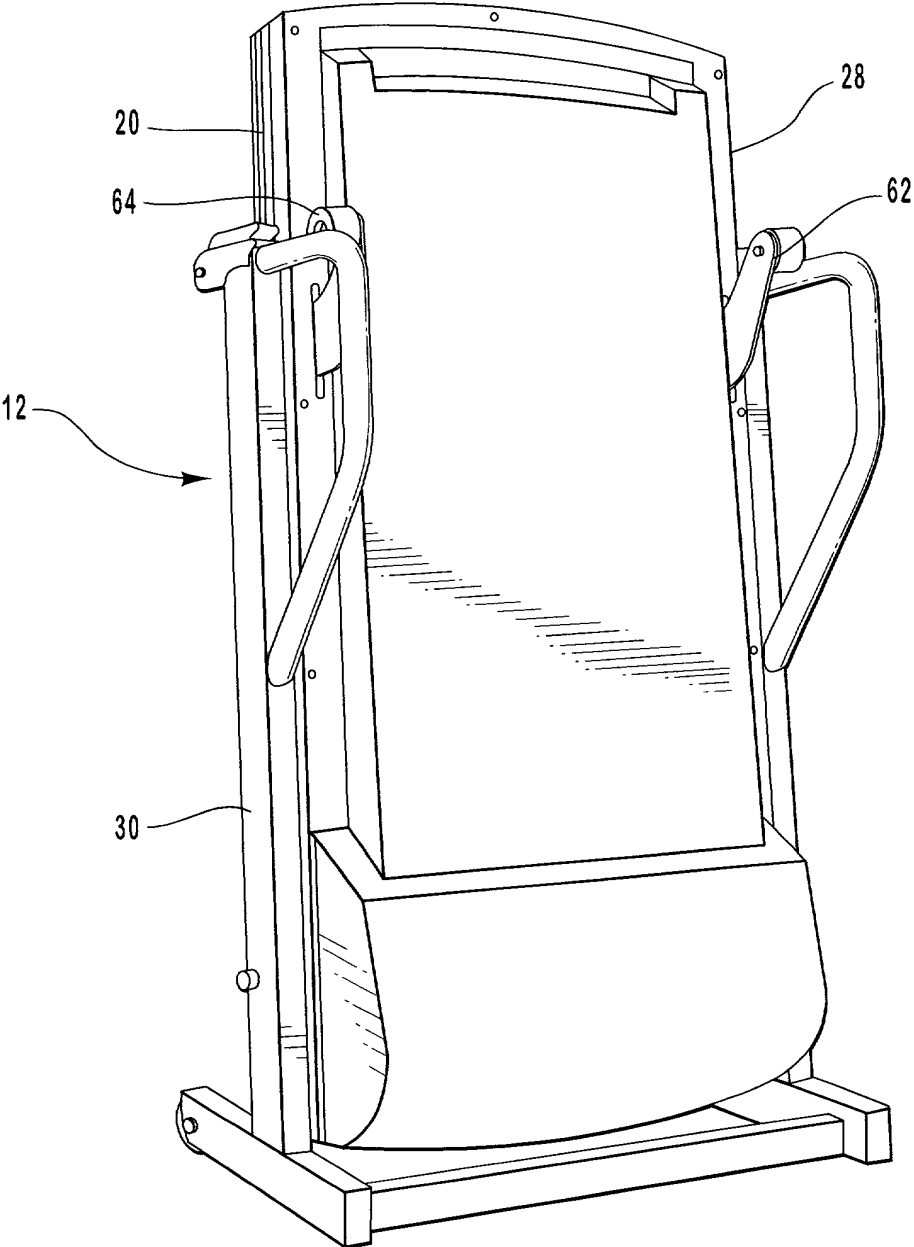
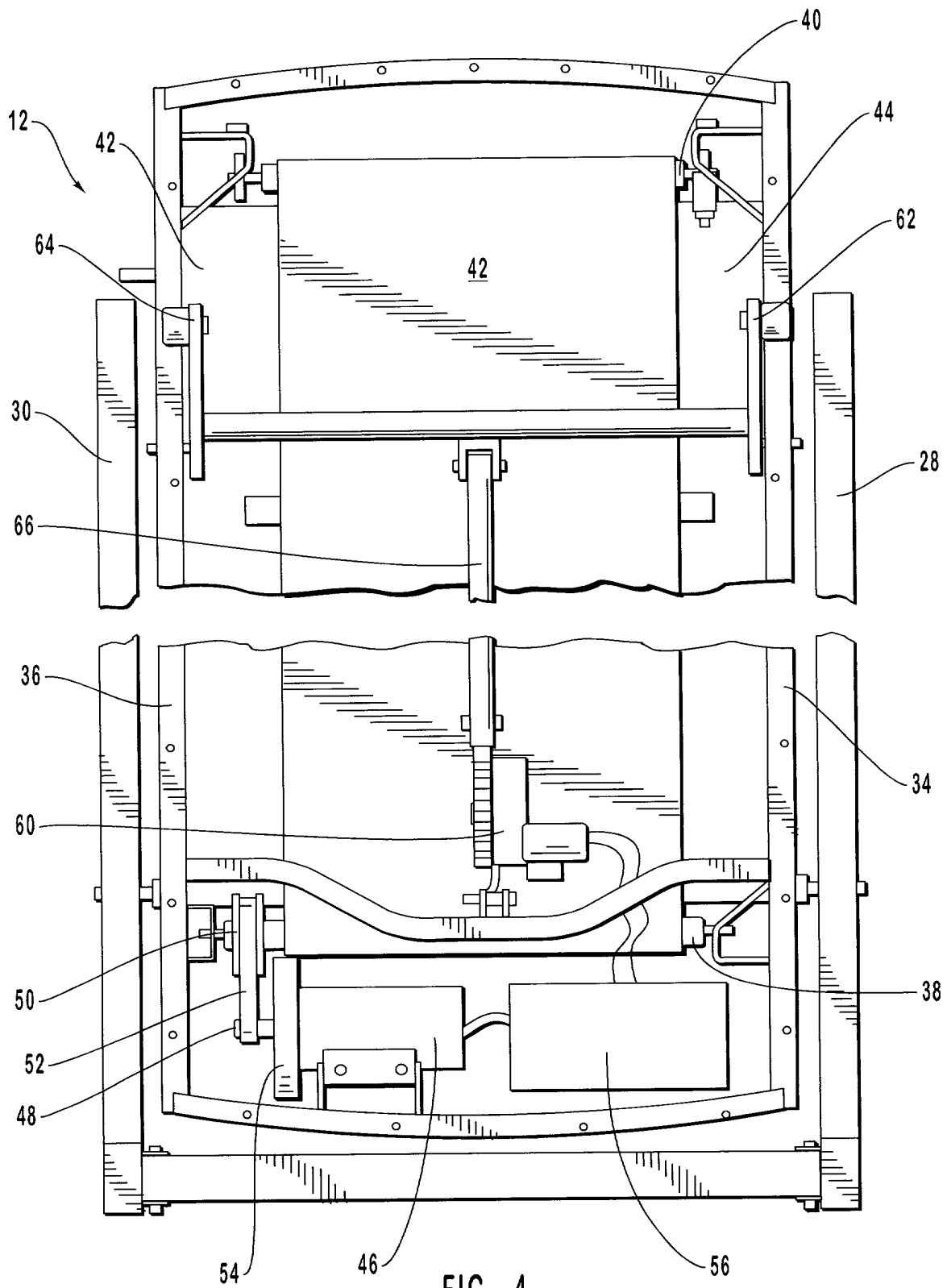


FIG. 3

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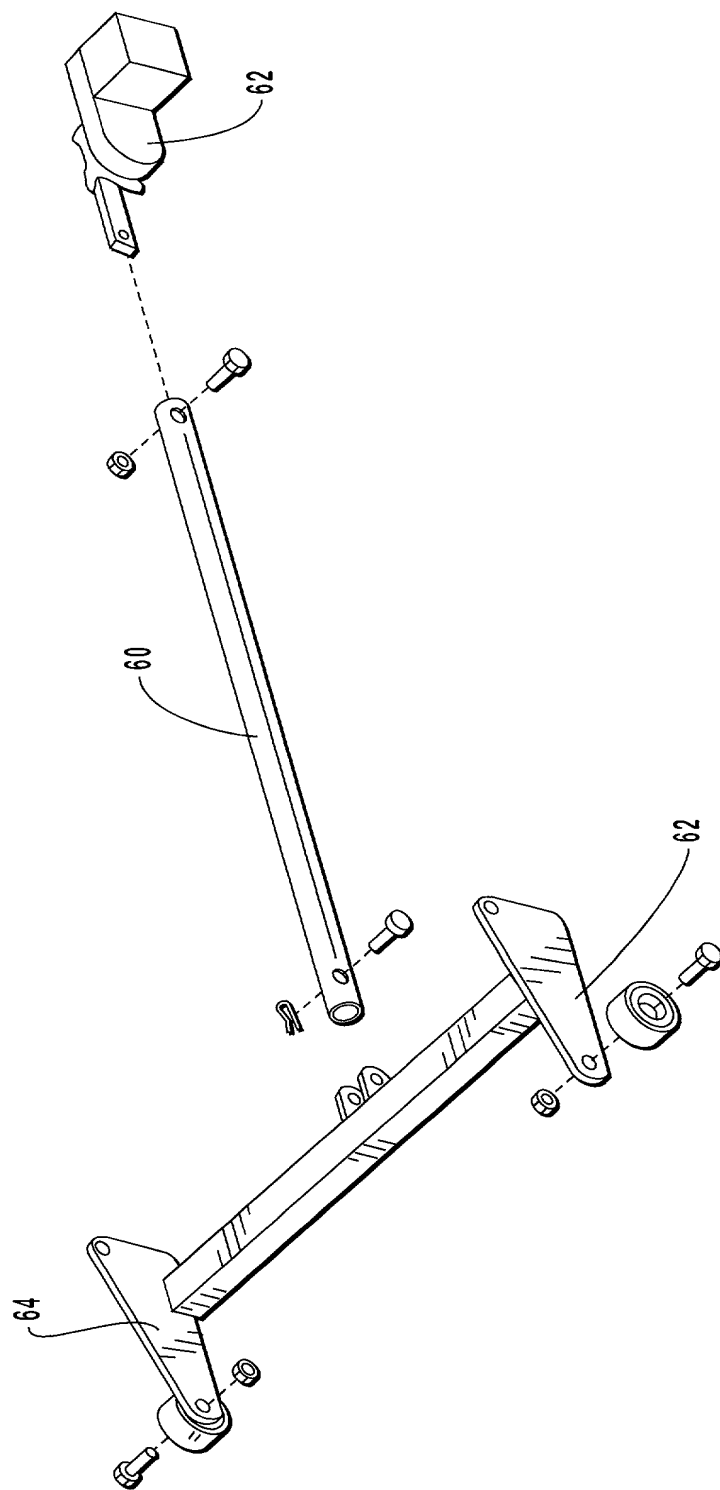
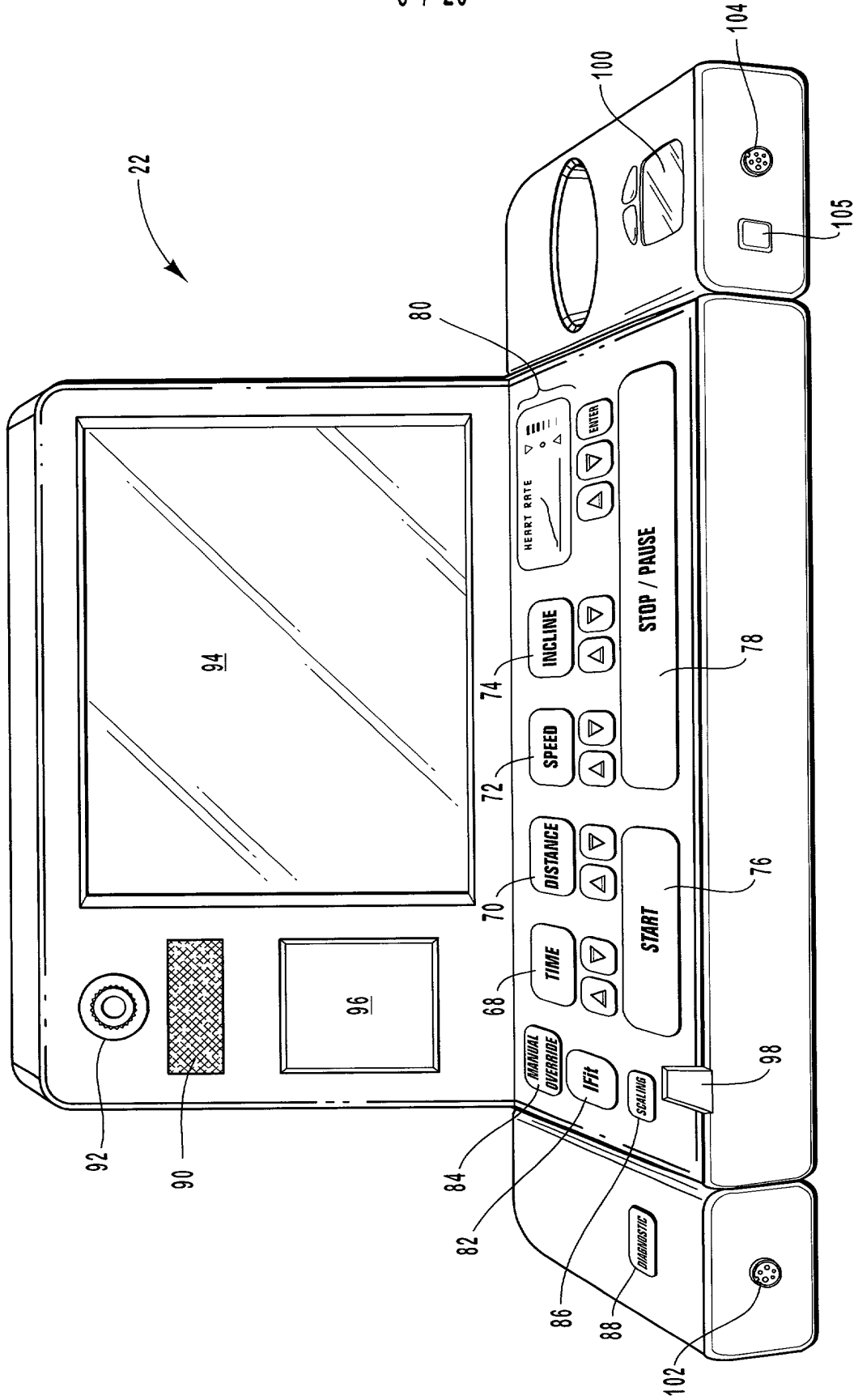


FIG. 5



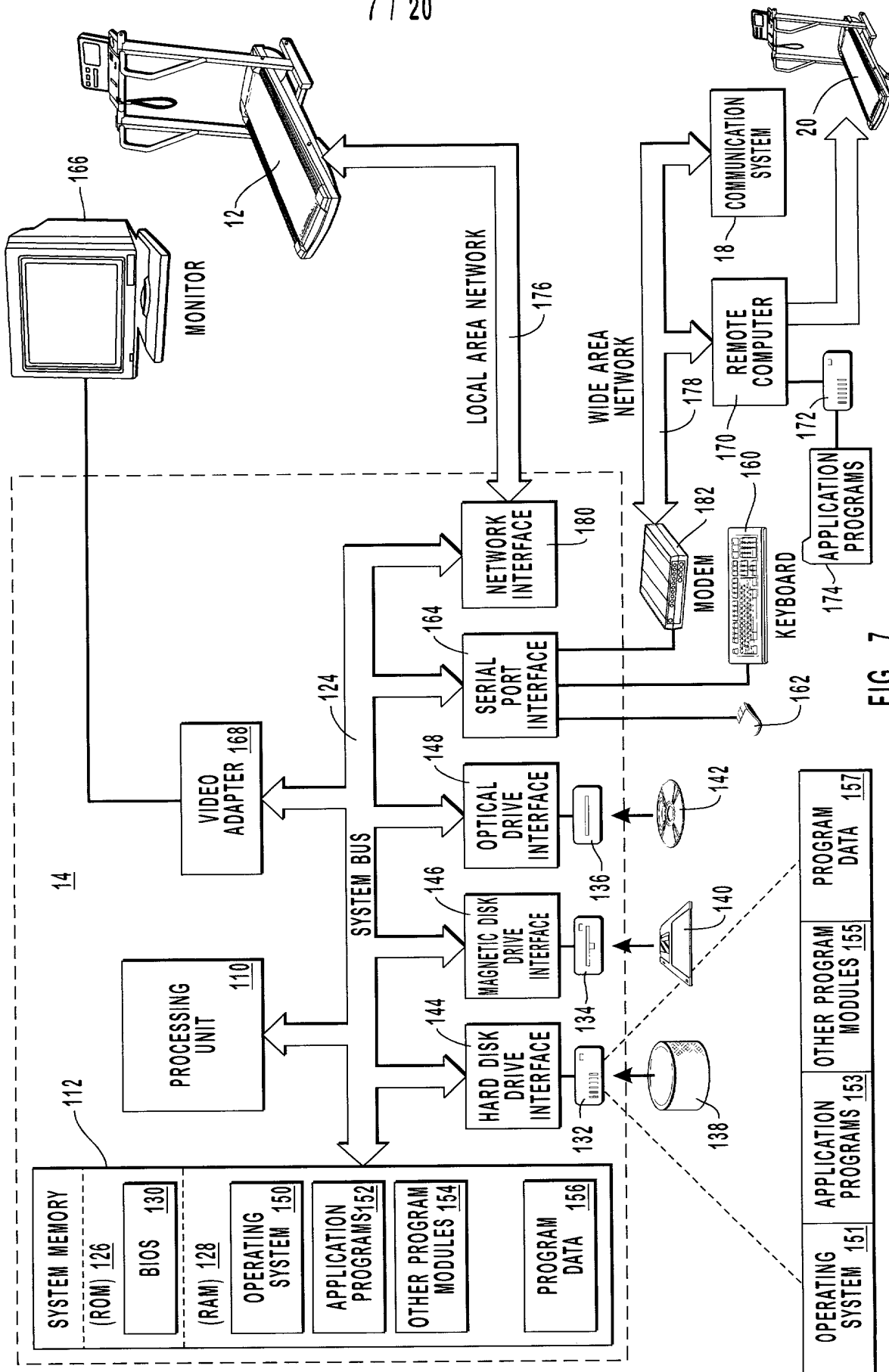


FIG. 7

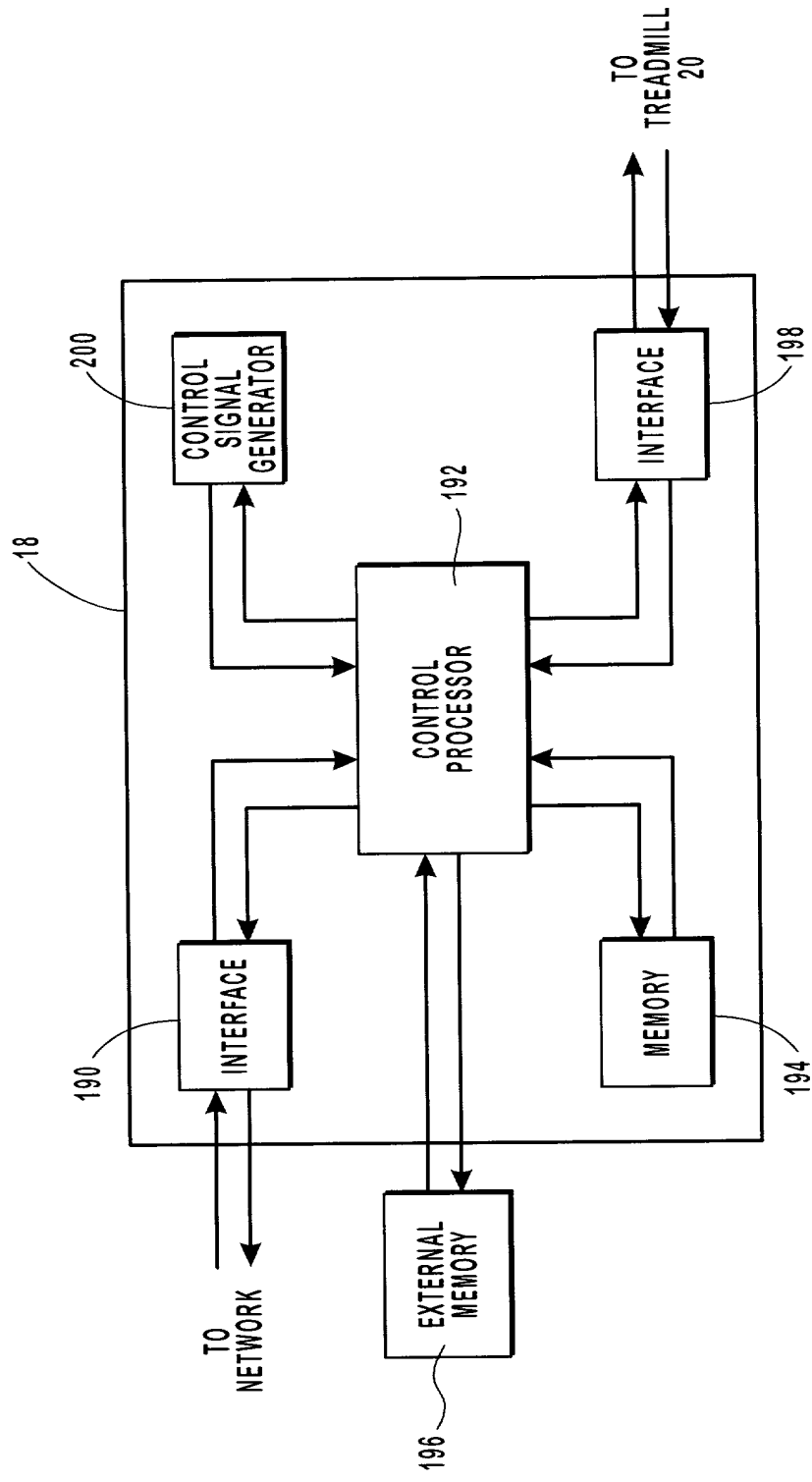


FIG. 8

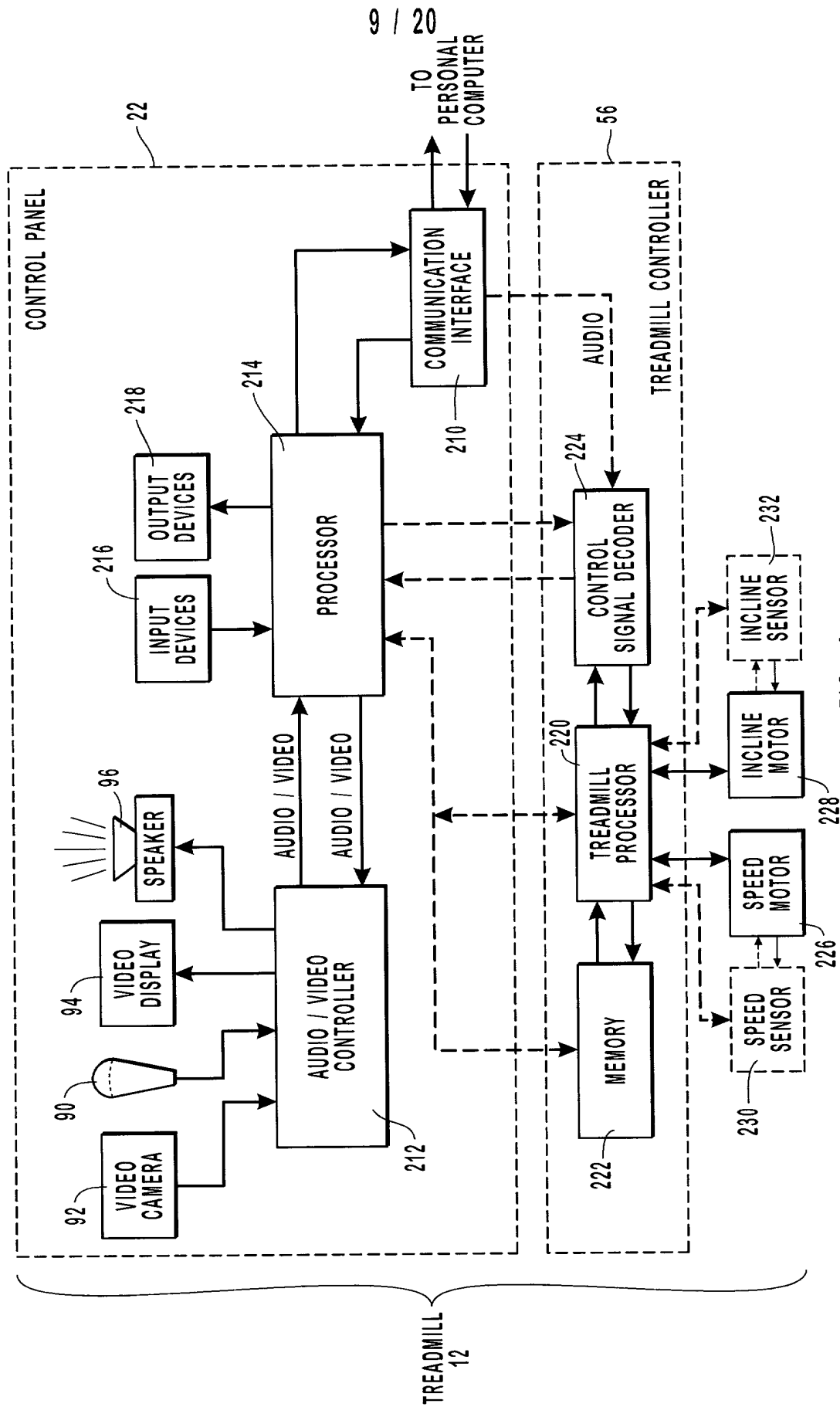


FIG. 9

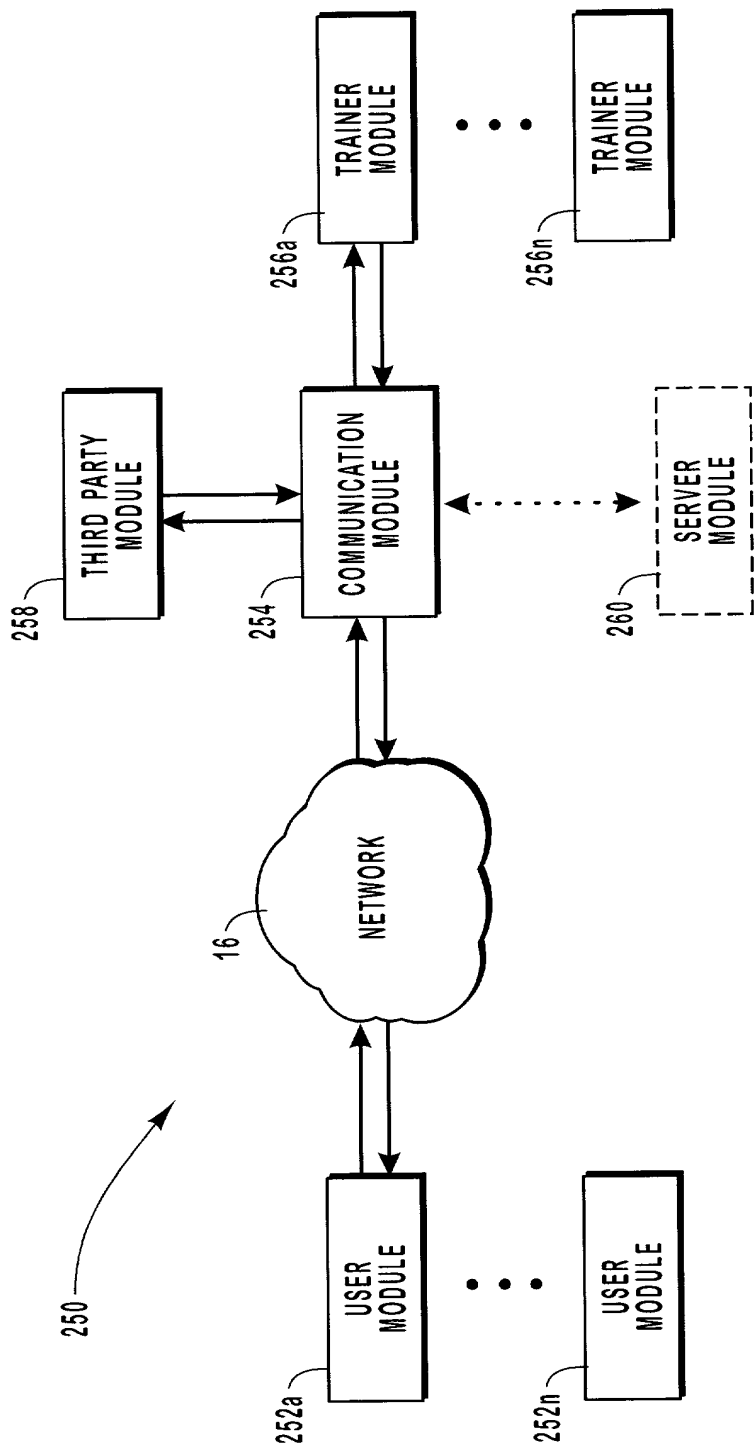


FIG. 10

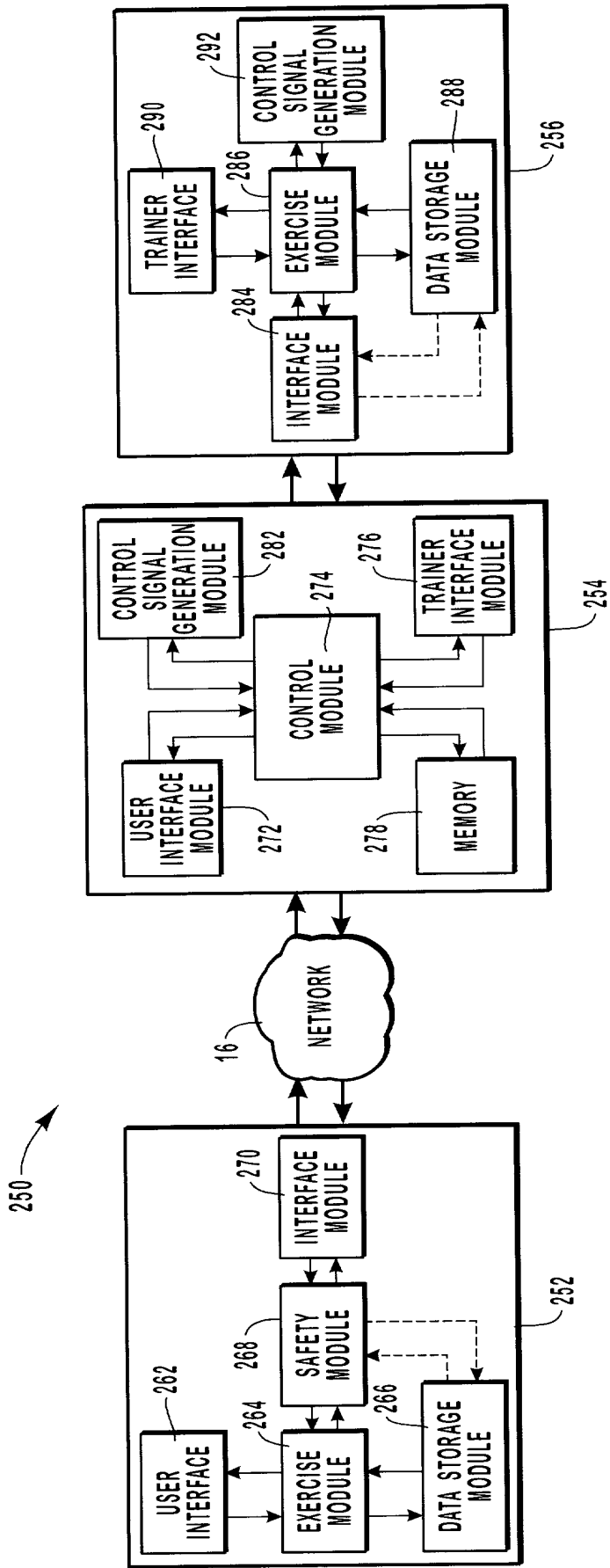
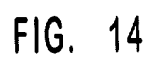
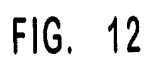


FIG. 11



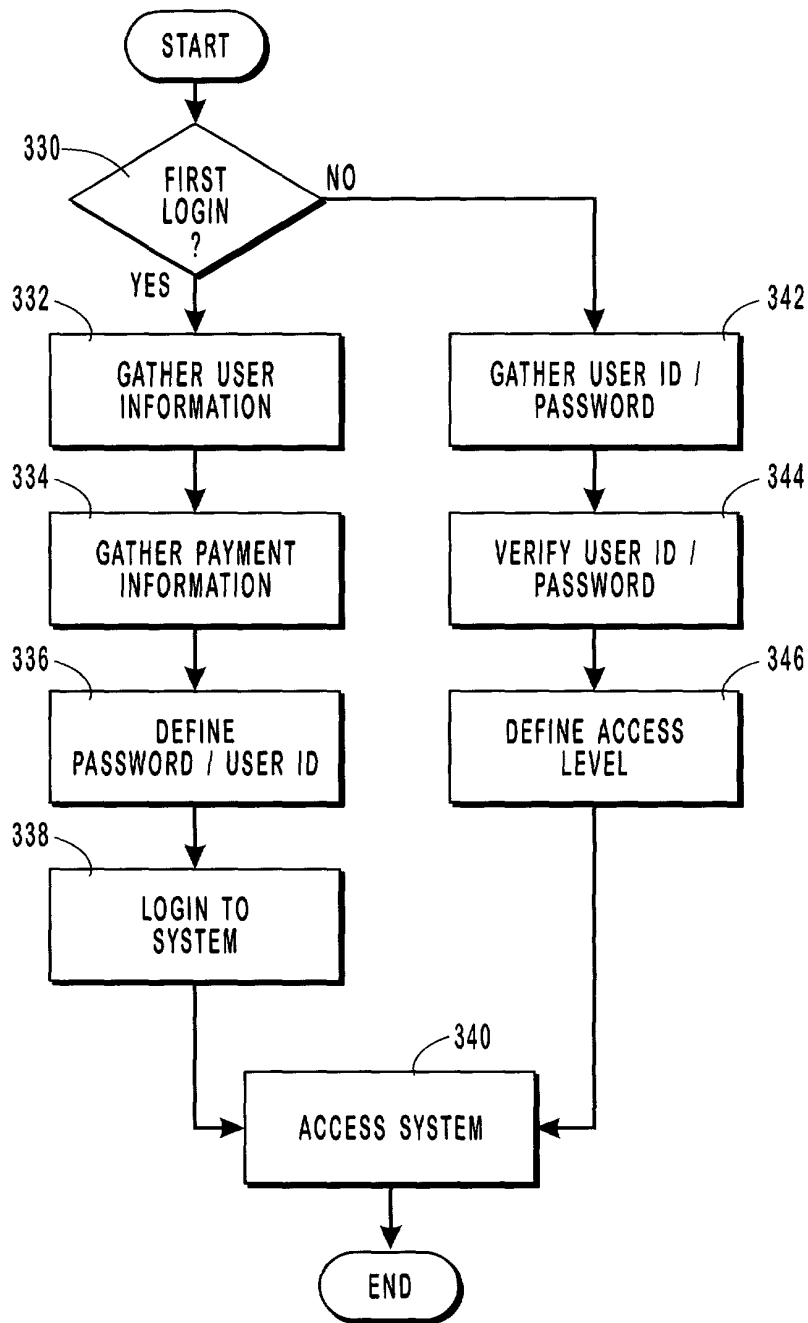


FIG. 13

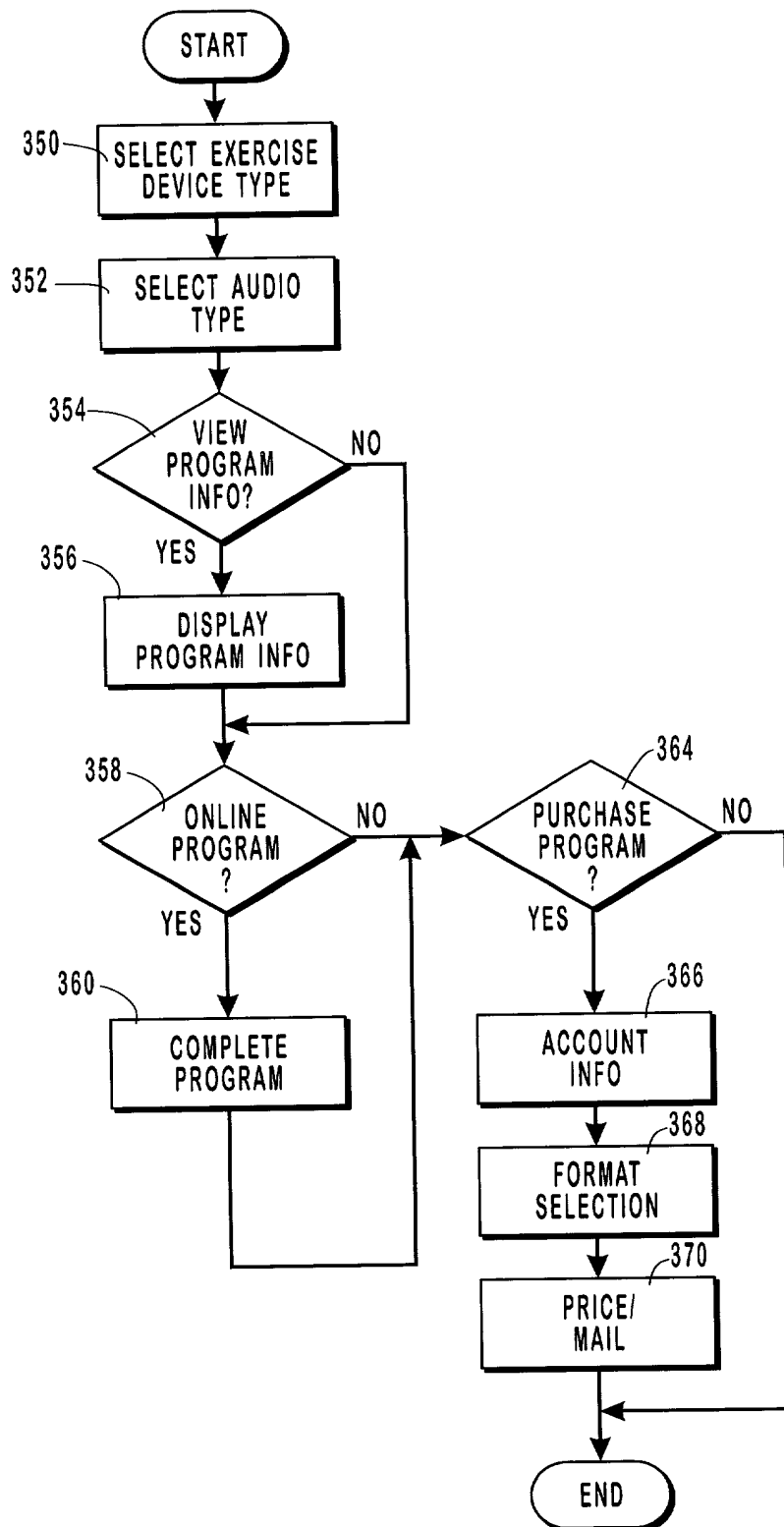


FIG. 15

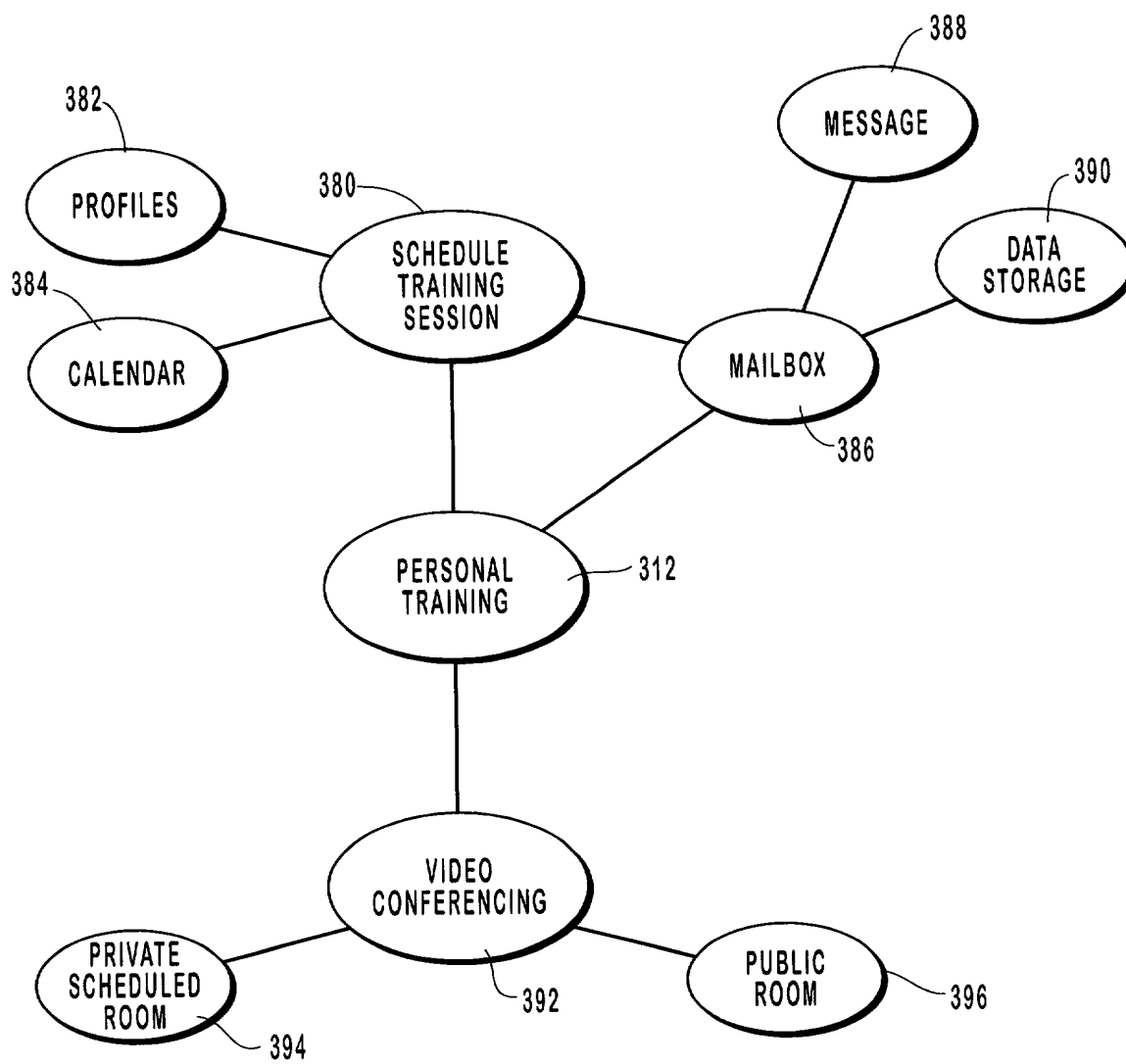


FIG. 16

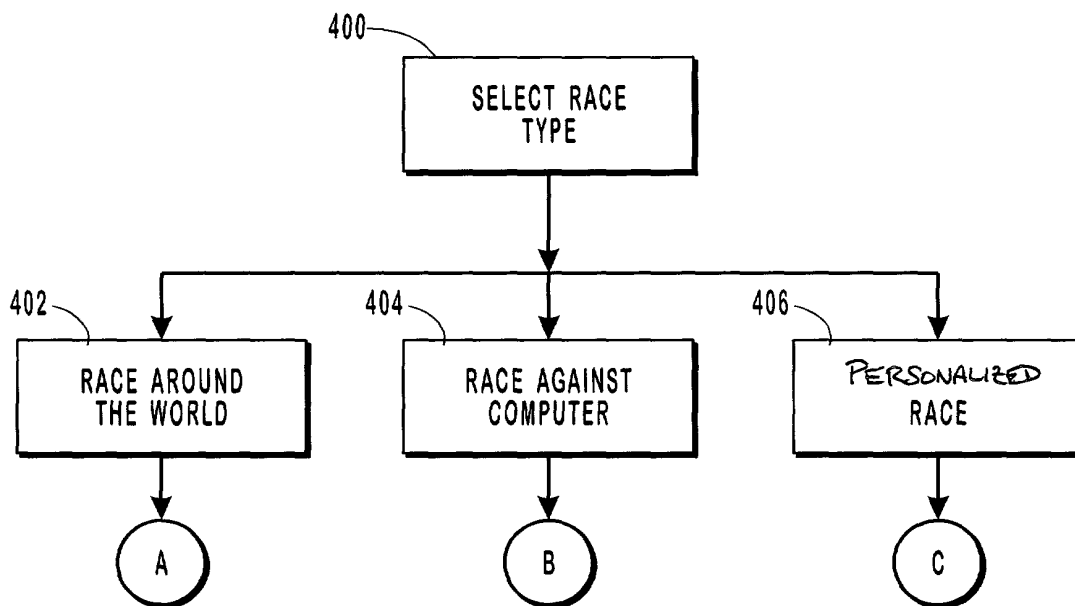


FIG. 17A

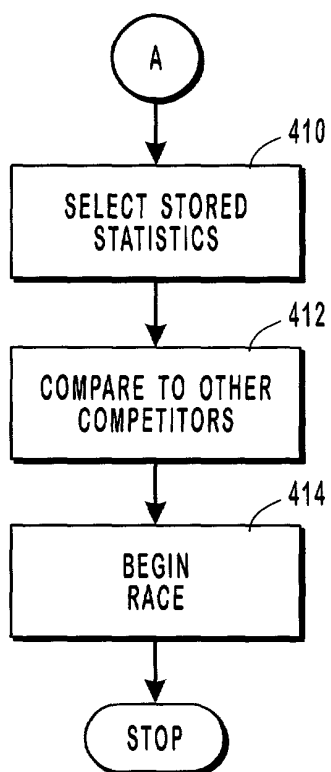


FIG. 17B

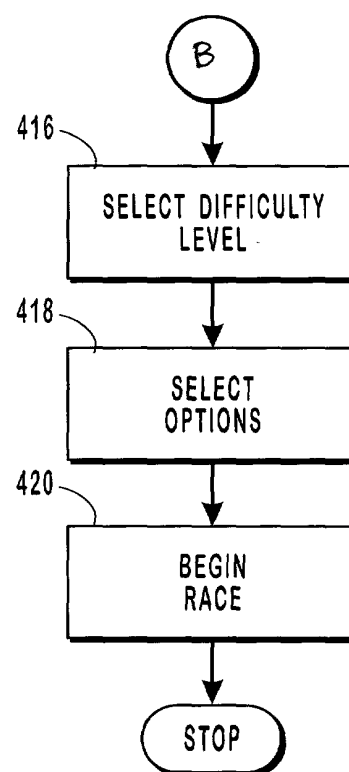


FIG. 17C

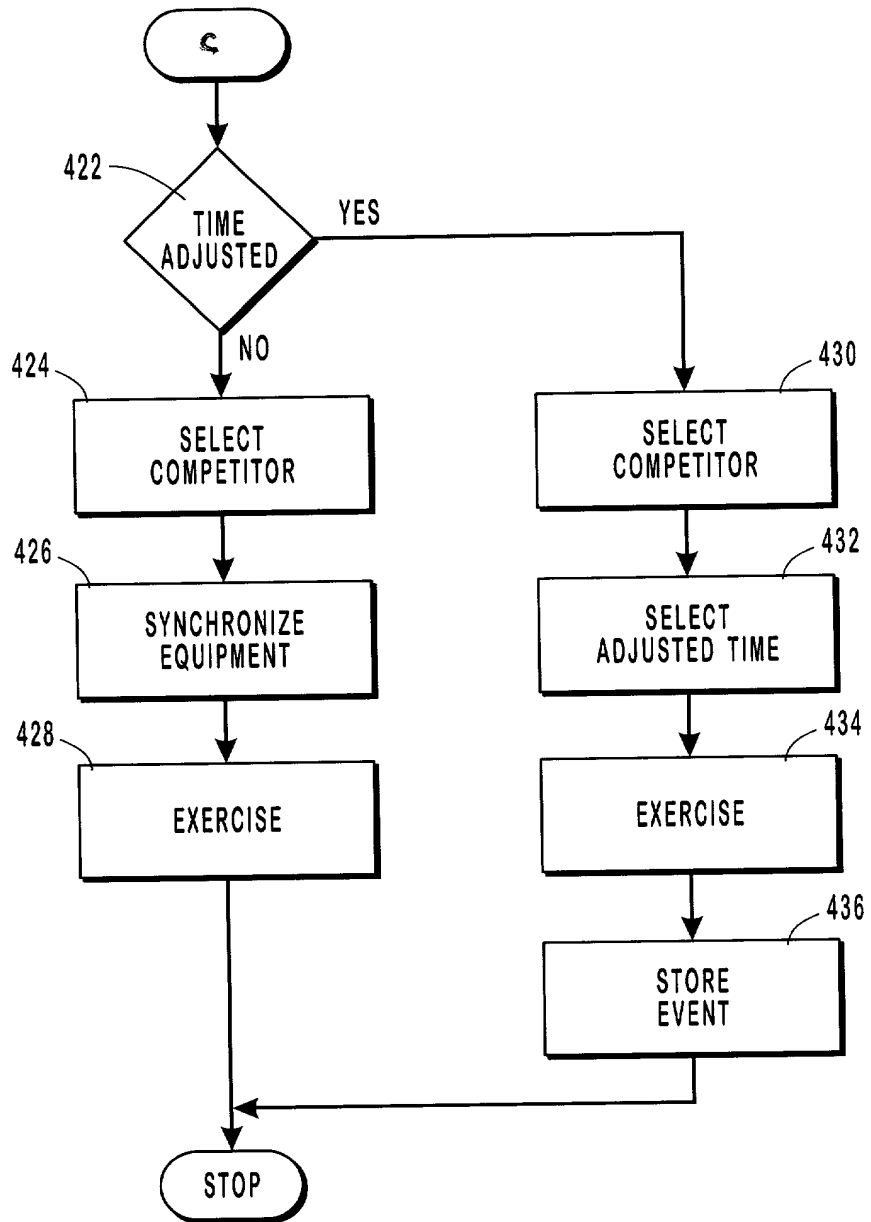


FIG. 17D

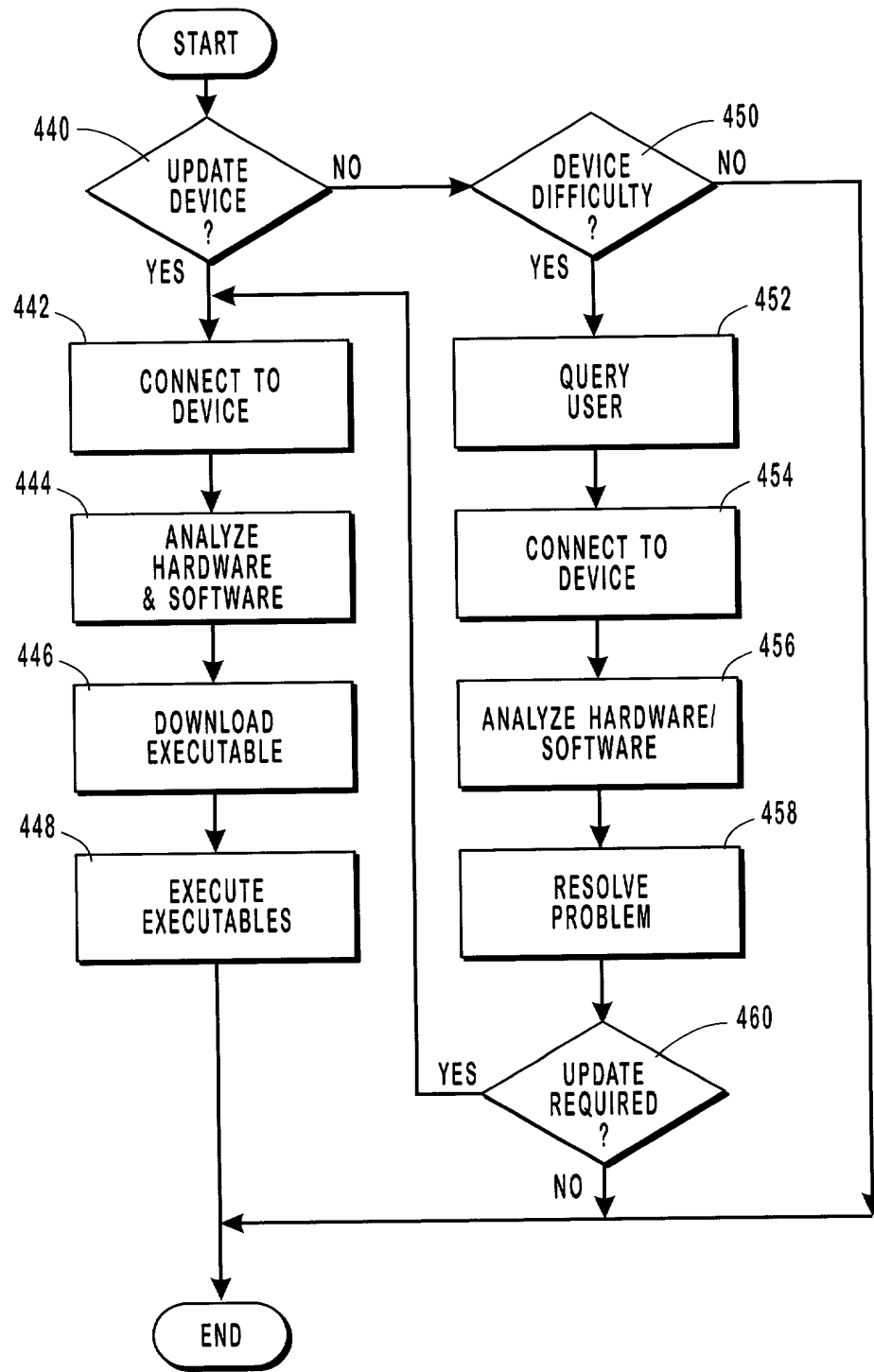


FIG. 18

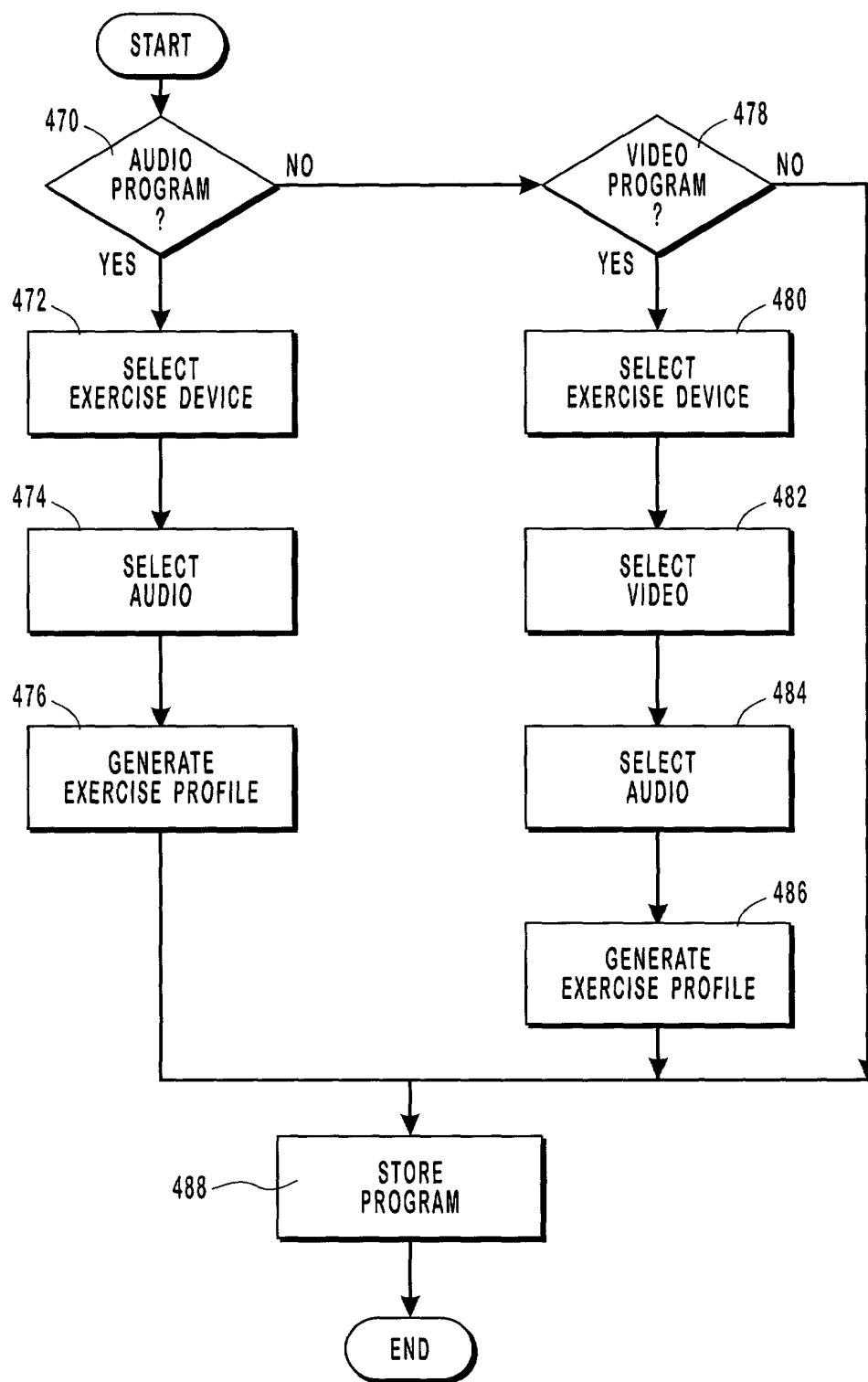


FIG. 19

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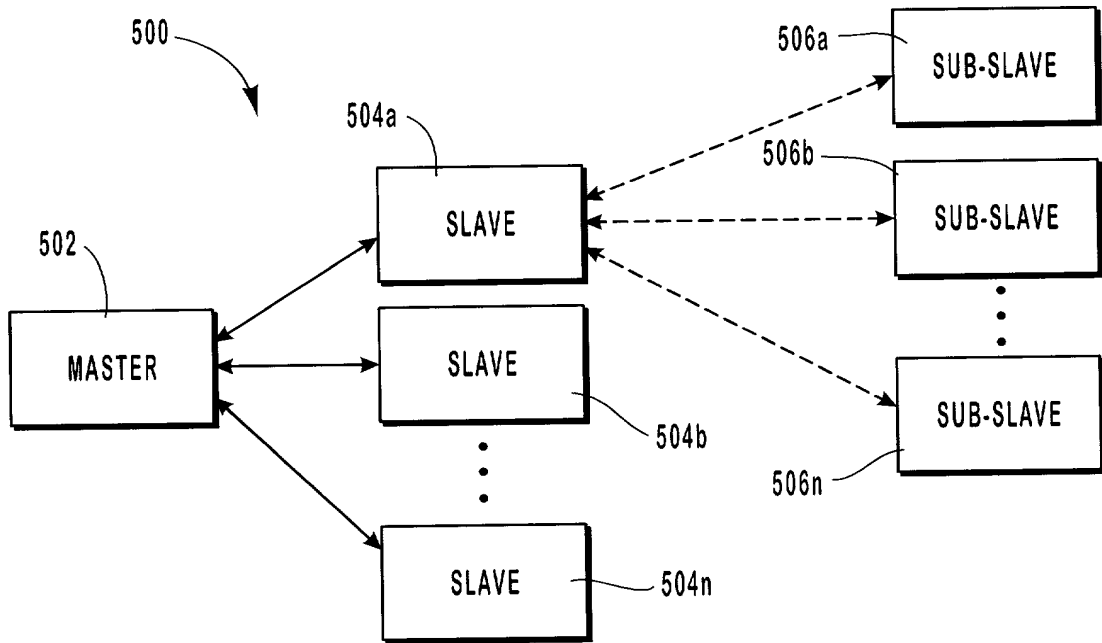


FIG. 20